THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. DECEMBER 26, 1895. CHICAGO, ILL. NUMBER 52.

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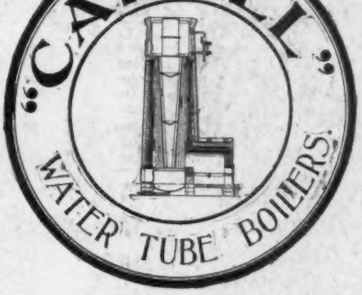

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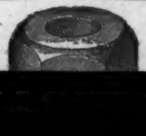

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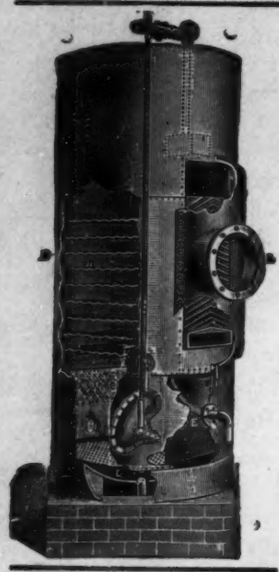

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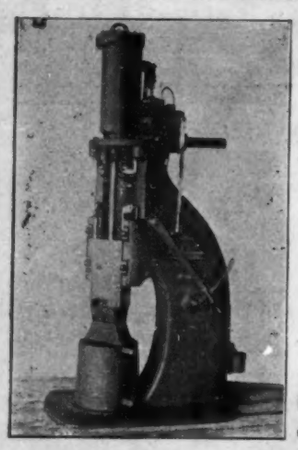

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. DECEMBER 26, 1895. CHICAGO, ILL. NUMBER 52.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

While holiday dullness is upon the iron market in all its departments, and seemingly intensified by contrast with the history made in the year just closing, there are reports from all quarters of inquiry, much of which means early business. Hesitation, rather than stagnation, is still the word. Here and there a buyer, who must know the cost of his raw material for the next six months, because of pending contracts with the consumers of his product, is taking hold at current prices; and these are so close to cost in nearly all cases that the transactions involve little or no risk. The truth is forced home upon many producers that the present basis of labor cost is out of proportion to current prices; and it would not be surprising, if the market continues at the present level, to see in January a movement for such a readjustment in wages as has been taking place in the product. Among furnacemen in the two valleys the labor question is in an unsettled state. While at some points the men have withdrawn their demand for more pay on Sundays, it is still open elsewhere. But this is a minor matter; the real issue ahead in the valley is a reduction of 20 to 25 per cent from present wages. It has not been formally discussed, but is among the early probabilities. Sales of Bessemer pig iron the past week have been at $10.75 at valley furnace, and it is intimated that $10.50 is a possibility. The fact that buyers who took considerable blocks of metal a few months ago, with deliveries in December and the early months of 1896, have paid a price per ton for the cancellation of their contracts leaves the iron on the furnace company's hands. To get this iron out of the way the makers have been content to realize cost, having already been paid their profit by the original buyers. Foundry irons do not show like weakness, because they were free from speculation, but prices are lower and $13.50 at valley furnace for No. 1 and $13 for No. 2 are current on small lots. What could be done on contracts for the first half of the year will only be known as inquiries come up. Southern sellers have made a formal reduction of $1 from prices maintained for several months, but this does not represent the extent of the cutting on going business. In the Eastern market the decline in prices is represented by recent sales of billets at $18.50 Philadelphia, with buyers' ideas at $18, and of No. 2X foundry at $12.25 to $12.50 and buyers offering $12. In the Central West there have been some sales of billets, at Cleveland prices of $16 and $16.25 and at $15.90 to $16 Wheeling district Tin plate and sheet mills have been buyers of steel at figures ranging from $18 to $19 for tin plate bars and sheet bars, delivered at Ohio mills. A Western steel mill took one of these contracts in the Cleveland district at $18.50 delivered. The effect of the general settling in values upon the views of producers of raw materials is seen in conferences over the price of coke for January and later delivery. The outcome is still uncertain. Tnere is a report that the present $1.60 basis for furnace coke will be continued, and that it will be not only the circular price but the actual price. There is also the report that the $2 programme will be carried out. It is believed that any contracts made will be limited to 30 days. In finished material sales have been small. Many mills are off in part and in some cases there is a complete shutdown. Whether the general starting up with the new year will bring a scramble for tonnage and even lower prices than to-day's is the question many would-be buyers are revolving while they wait. With a lower price for rails and the placing of a fair tonnage by the railroads, the pace might be set for a general buying movement that would at least sustain to-day's basis.

THE CLEVELAND DISTRICT.

Discussion of the price of ore for 1896 is less active among sellers of iron ore than among consuming interests. There has been not a little guessing of late in some of the printed comment on the situation, but it seems to be forgotten in these attempts at forecasting that there are one or two questions that immediately overshadow that of price. The attitude of leading interests on the Mesabi raage is one of these. It can hardly be taken for granted, because of the Mesabi's great capacity for Bessemer ore production in 1896, that therefore no agreement among Bessemer ore producers will include that range. The ability to produce was great in the year just closing. A year ago careful estimates put the possibilities for 1895 shipments at 4,500,000 tons, but the actual was about 1,750,000 tons less. A question more to the point is what proportion of the consumption of Lake Superior Bessemers in 1895 was Mesabi Bessemer. If, say, 7,250,000 tons of Bessemer ores and of ores going into Bessemer mixtures were shipped in 1895, and the Mesabi contributed 2,000,000 tons of this (leaving 750,000 tons of its output non-Bessemer) some criterion is afforded of the proportion the Mesabi will furnish of the Bessemer ores that will be bought in 1896. Some furnacemen are increasing their use of Mesabi ores; others will take no more than their present percentage. The action of producers on the new range in reference to a price agreement will not be determined, therefore, so much by their ability to produce, as by their ability to sell. Seeing that there is a limitation from without on their output, it is natural to assume that the Mesabi companies will have a like desire with those on other ranges to get a profit on the ore they take out.

Pig Iron. Bessemer pig iron has sold at $10.75 in the valley the past week and $10.50 is a possibility on some of the iron left in makers' hands by Pittsburg buyers who have had contracts canceled at an agreed price. This element of weakness may be felt for some time, but it is argued by furnacemen that prices made under this influence cannot last because they represent cost and below. The labor question still has possibilities of curtailment of output. One Sharpsville furnace is out on account of an unsettled dispute and at New Castle there may be a suspension January 1. There are indications that furnace workers will be confronted at the first of the year with a reduction to

Continued on page 7.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The inquiry for material delivery for the first half of 1896 continues to be very large, but as yet no orders of any particular size have been placed by any consumers. It seems to be a fact that a number of the largest buyers have become frightened by the recent large reductions in prices and have adopted the policy of buying only from hand to mouth in such quantities as they may need for immediate use, until the market is in a more satisfactory condition than at present. Some of the largest manufacturers of iron and steel products in this territory and of pig iron in the South are refusing to quote on their products in the present condition of the market, preferring to wait until later in the season, when it seems probable to them that prices will be higher. This is particularly true of pig iron makers, as all but one of the furnace companies in this territory are practically out of the market. One prominent pig iron man, in conversation with the writer, stated that he had not sold 100 tons of iron in the last month and would not sell at the present prices even if he had no orders on hand at all. He considered it more profitable to stack his iron than to offer it for sale with quotations no higher than at present. The bar iron market has been very quiet and the important news is the reduction of $3 a ton on bars made last week by the Association at Chicago. In rails, billets and rods almost no business is being done, on the latter two commodities the local mills refusing to make offers at the present prices. Structural material continues in very quiet demand for small lots. One or two large contracts were placed last week. Other classes of material are about as last reported with no important changes in the situation.

PIG IRON.—Many inquiries are noted for pig iron for delivery the first half of next year and there seems to be a growing feeling among consumers that it will be better for them to purchase only for their immediate necessities rather than to make long time contracts, owing to the unsettled condition of the market. Southern furnaces reduced their quotations $1 a ton the first part of last week and this has had the effect of frightening a number of large buyers who had proposed to place orders in the near future. It is a difficult matter to tell what next month will bring forth, and arguments are made by both buyers and sellers to show that prices will be both higher and lower. It seems probable that if buying in the first half of January is anywhere near as heavy as it is expected to be by the furnace companies, quotations will be materially stiffened and the market in very much better shape than it is at present. Prices on local irons are also a little weaker, and while no actual reductions have been made we have reduced our quotations to more nearly meet the present situation. In Lake Superior charcoal a good business has been done, including several round lots. Quotations are made as follows:

Lake Sup. Charcoal	$14 50@15 50	Southern No. 2 Soft	$ @12 85
Local Coke Fdy. No. 1	14 50@15 00	South'n Silveries No. 1	@14 00
Local Coke Fdy. No. 2	14 00@14 50	South'n Silveries No. 2	@13 50
Local Coke Fdy. No. 3	13 50@14 00	Jackson Co. Silveries	14 50@16 00
Local Scotch Fdy. No. 1	14 50@15 00	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	14 00@14 50	Ohio Silveries No. 2	14 50@15 00
Local Scotch Fdy. No. 3	13 50@14 00	Ohio Strong Softeners	15 00@15 50
South'n Coke No. 2	@12 85	Alabama Car Wheel	17 00@17 50
South'n Coke No. 3	@12 60	Malleable Bessemer	
Southern No. 1 Soft	@13 10	Coke Bessemer	

BARS.—The most important development is the reduction of $3 a ton on bar iron made by the Merchant Bar Iron Association at the Chicago meeting last week. This makes the association prices 1.35c for common iron and 1.45c for guaranteed. Sales have been only small and it does not seem probable that any particularly large business will be placed before next month. Soft steel bars are in small demand and are quoted at 1.42½c from strictly billet stock, Chicago.

RAILS AND TRACK SUPPLIES.—The situation is unchanged and very little business was done in this market last week. Quotations are as follows: Rails, $29 and up; splice bars, 1.65c to 1.75c; track bolts, 2.25c to 2.45c; spikes, 1.95c to 2c.

BILLETS AND RODS.—The local mills are still practically out of the market, refusing to meet prices made by Eastern manufacturers, and as a consequence their sales last week were almost nothing. It is expected, however, that the demand after the first of the year will be very large.

STRUCTURAL MATERIAL.—The contract for the Wabash avenue extension of the Union Elevated loop, amounting to 1,200 tons, was placed last week. A Southern railroad came into the market with specifications for 1,200 tons of bridge work. The Duluth & Iron Range placed orders for about 400 tons of bridge material. A contract has also been placed for 400 tons of plates and angles for additional ore chutes at Superior. Besides this, inquiries have been received from various bridge builders for an aggregate of about 3,000 tons of material. The small trade is very quiet and will probably remain so for several weeks. Quotations are made as follows: Beams and channels, 1.75c to 1.80c; angles, 1.55c to 1.60c; plates, 1.60c to 1.65c; tees, 1.85c to 1.90c. Small lots from stock are quoted ¼c to ½c higher.

PLATES.—No especially large business was closed last week and it is not probable that anything will come up in the near future of any particular size. Quotations are made as follows: Tank steel, 1.60c to 1.65c; flange steel, 1.80c to 1.90c; firebox steel, 2.85c to 5c; boiler tubes, 60 to 65 per cent discount.

MERCHANT STEEL.—The inquiry for delivery for next year continues very large, but so far no contracts of any particular size have been placed. Quotations are made as follows: Open-hearth spring, tire and machinery steel, 2.10c to 2.15c; smooth finished machinery steel, 1.85c to 1.90c; smooth finished tire, 1.80c to 1.85c; tool steel, 5.50c to 7.50c; specials, 11c and upwards; Bessemer bars, 1.55c to 1.65c.

SHEETS.—A large demand has been received for black sheets for delivery after the first of the year, and it is very probable that the inquiries will develop into orders within a very short. Quotations are still made at 2.45c to 2.50c for No. 27 common. Galvanized iron continues in good demand. It is reported that one sale of a little less than 200 tons was made last week. It is quoted at 75 and 10 and 5 per cent off by most mills, although there are rumors that 80 per cent discount has been made.

OLD RAILS AND WHEELS.—The market is very quiet and no transactions of any size are reported. Quotations are made from $13.50 to $15 on old wheels. Old iron rails $16, and old steel rails $11 to $12, according to length, etc.

SCRAP.—The demand has been very light and almost no business has been done. Dealers do not appear particularly anxious to sell at the present prices, preferring to hold until next year. The following are buying quotations furnished by dealers: Railroad forge, $11.50; dealer's forge, $10; No. 1 mill, $7.50; railroad cast, gross ton, $10; machinery cast, $11; axles, $14; cast borings, $5; wrought turnings, $6; axle turnings, $7; mixed steel, $8; stoveplates, $6 to $6.50; heavy melting steel, $10.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The holiday lull is even more pronounced than usual, this year. The shut-down in various departments of the largest steel works of the district began earlier than is customary, and it is expected that operations will be resumed in most of the idle mil s of this company by the latter portion of the week. One block to operations in the various steel mills is the fact that deliveries are being postponed. It is known, too, that some buyers of Bessemer pig have made what terms they could with the sellers to have contracts canceled. This has thrown considerable Bessemer on the market, and there is a further weakening of prices. Sales have been made at $11.50 delivered in Pittsburg, equivalent to $10.75 in the valley, and it is reported that $10.50 at valley furnace can be done. When present cost of labor, coke and ore is taken into consideration, it is plain that this is the cost mark for most furnaces at valley points. Very little is doing in foundry irons and gray forge is very quiet No. 1 foundry is quoted at $13 75 Pittsburg and No. 2 at $13@$13.25. The enormous production of pig iron makes it improbable that a firmer market will be seen for some weeks. Steel billets have been weaker, though it was supposed the $16.50 Pittsburg business of last week was very close to cost. Sales totaling about 10,000 tons, deliveries in the first quarter of 1896, are reported at prices ranging from $15.90 to $16.10 at Wheeling district mill. It is reported that $15.75 Wheeling is a possibility, and while the belief is expressed that bottom has been reached, the feeling is one of extreme weakness. Orders for finished material which are needed to give tone to the steel market are meager, and the buying movement promises to be delayed several weeks beyond the first of the year. In skelp iron there is little doing and for pipe works product prices are further shaded. Some inquiry for sheets is noted, and mills are covering their raw material at very low prices. Contracts for sheet bars are reported at from $17 to $18 Pittsburg mill, and the margin over the price of billets has been cut down materially from the $2.50 to $3 difference maintained a few months ago. An advance in Connellsville coke workers' wages is announced. For mining the increase is 16⅔ per cent., or from 90c. to $1.05. It is stated that furnace coke is not likely to go to $2; the figures named are $1.60 and $1.75, but no contracts will be made, except from month to month.

Cincinnati. The market during the week has been unsteady and yielding, with a downward tendency, occasioned by the cognizance of the largest production and shipment of Lake Superior ore ever known, the continuance of pig iron manufacture on the largest scale the country has ever experienced, and a natural falling off in consumption of iron incident to the season. The pig iron business of the past week has been largely in round lots for scattered future delivery. The small buyers have not figured conspicuously in the trade, though numerous "filling out" small orders for immediate shipment have been booked. The transactions in the main have been worked out separately and independently as to price, as the views of the buyer and seller might be harmonized into a contract figure. The probability of increased gold exports and advance of interest rates, creates disturbance at money centers, and will interfere with legitimate financial transactions in the usual conduct of easy regular monetary trades, but there is a well grounded belief that wise counsels will prevail and a diplomatic adjustment of the differences avert open hostilities. Stocks of iron in the hands of consumers are not large, and at prices obtainable an increased business is certain the approaching week, and the sales of pig iron in the closing ten days of the year will aggregate a large tonnage. The advance in ores, fuel and labor has increased very materially the cost of pig iron and thoughtful buyers realize that iron is cheap at figures prevailing.

Buffalo. The local pig iron market continues weak, one reason being that we have now reached the inventory period and the majority of iron foundries are either shut down or preparing to stop to take the yearly account of stock. This in a great many cases necessitates a request that shipments be suspended for a week or two, but some furnaces seem to feel these requests are more from the fact that the general consumption of pig iron is growing less. As a matter of fact, however, these requests for suspended delivery are generally accompanied by a clearly expressed wish to have shipments resumed promptly when inventory has been taken, the statement being made that they expect to go ahead at at least the rate of consumption they have seen for some time past. This very encouraging feature, together with the fact that a great many large contracts are under consideration, would make it seem as though prices would stiffen early in the new year.

Iron and Steel Freights to the Pacific Coast.

The Interstate Commerce Commission has decided in favor of the steel company, in the case of the Colorado Fuel & Iron Co., against the Southern Pacific Co. and other carriers, relating to the legality of rates on steel rails, bar iron and other iron and steel articles from Pueblo, Col., to San Francisco. The complaint alleged that the defendants charged an unreasonable and unjust rate of $1.60 per hundred pounds on these articles from Pueblo to San Francisco, while from Chicago the rate was only 60 cents per hundred pounds on steel rails, and 50 cents on bar iron and similar iron traffic. It also appears that the same rates were in force to San Francisco from Missouri river and Mississippi river points as from Chicago, and that these rates of 60 cents on rails and 50 cents on bar iron were also in effect from New York to San Francisco. In their answers the defendants offered conditionally to put in the same rates from Pueblo to San Francisco, as those in force from the Missouri river.

In its decision the commission held that the shipment of iron and steel from foreign countries to San Francisco at low rates by water affects the iron and steel industry at Pueblo as well as at eastern points in respect to participation in supplying that market. Rates in force from Pueblo to San Francisco prohibit the movement of iron and steel articles from the former place to the latter, while greatly lower rates from other and far more distant points prevail on such traffic to San Francisco, and the carriers' cost of transportation is much less from Pueblo than from such more distant points of shipment.

The order of the commission is that the rates from Pueblo to San Francisco should not exceed 45 cents per hundred pounds on steel rails and railway fastenings, or 37½ cents per hundred pounds on bar iron, cast iron water pipe, pig iron, billets, blooms, rivets, nails and spikes, nor should the rates from Pueblo to San Francisco on such traffic or on other iron and steel articles be greater at any time than 75 per cent of rates contemporaneously in force on like traffic from Chicago to San Francisco over any of the defendant roads.

SENATOR QUAY has introduced a bill authorizing the Court of Claims, without regard to the statute of limitations, to try claims for the refunding of duties paid in excess of the duties imposed by law on steel blooms imported from 1879 to 1882. The following firms among others are named in the bill: J. F. Bailey & Co., H. E. Collins & Co., Oliver L. Garrison, A. H. Childs, agent for H. W. Oliver, Jr.; Diamond State Iron Co., Baltimore & Ohio Railroad, H. W. Oliver, Jr., Lewis, Oliver & Phillips, Edgar Thomson Steel Works, Carnegie Bros. & Co.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

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DECEMBER 26, 1895.

AFTER a season of ill fortune, in which high cost of steel at home and sharp competition from abroad have combined to take away their profits, forcing some of them to close down, American tin plate manufacturers note several developments that give better promise for 1896. To begin with, it is probable that the trunk lines will enforce strictly the agreement they have entered into recently which does away with through bills of lading on Welsh tin plate from foreign port to interior points in the United States. This means that the foreign plate will pay the same freight from the seaboard to its destination that is paid by home-made tin plates carried the same haul. Again, the home tin plate manufacturer is now able to contract at exceedingly low prices for his tin plate bars, deliveries extending through the first half of 1896—nearly $8 a ton, in some instances, below the top-notch price reached in last summer's boom. On the other side a shutting down of a portion of the Welsh works will make plates scarcer and somewhat higher, and manufacturers there are paying but little less for tin plate bars than the high prices prevailing there two and three months ago. Last of all is the possibility, not yet a probability, that an addition of 15 per cent. will be made to the tariff on tin plate, in common with other articles on the metal schedule.

THE advance in Connellsville coke workers' wages made last April was convincing to buyers that the turn in iron was at hand, and from it dated the improvement in prices of iron and steel that soon brought on a boom. The circumstances attending the advance in wages just announced are different; but a common feature is that very low prices for iron and steel products preceded each advance. It is known, moreover, that to-day's prices for Bessemer iron bear about the same relation to present cost as the market price early in the year bore to the cost of that time. More than $1 a ton has been added to the cost of Bessemer pig iron in the past 10 months, the wage cost alone having been increased 35 to 40 cents a ton. It can be seen that $10.50 and $10.75 Bessemer iron at valley furnace represents a loss, or, at best, an absence of profit to some makers. Now that the price of coke is certain to advance, whether it be to a strict $1.60 basis, or to $1.75 or $2, there will be an added fuel cost that, it would seem, must put any further decline in Bessemer pig out of the question. Even were the new price to be but $1.60, the present circular rate, which no furnace has paid as yet, existing contracts being all the way from $1.15 to $1.45, there would be an increase of from 15 to 45 cents on every ton of iron from the furnace. If the heavy production of pig iron is kept up, and the necessities of some producers lead them to make sales at a loss, there are others that stand ready to pile their iron, or, if need be, to go out of blast, rather than contribute to the demoralization of the market. An uncertain factor in the case is the cost of blast furnace labor. It might be considered something of an anomaly to have an advance in coke workers' wages followed by a reduction in furnace labor; but the conditions of the two industries are not similar. The reduction of the competitive element to a minimum has made possible the advance in coke prices that carries with it an advance in wages; in pig iron there is just now a maximum of competition—output at the highest point and demand almost at the lowest. However, there should be some sentimental strengthening of the situation in view of the Connellsville movement; but it will have to come from the placing of orders for finished material by large interests who are convinced that the decline has spent itself.

THE proposed tariff and currency measure, that is presented to Congress by the Ways and Means Committee, to meet the emergency emphasized in President Cleveland's sensational message, is objectionable, as every make-shift measure must be. The chief claim for its tariff sections is that they promise to add $40,000 000 a year to the revenues of the government and will check the growing deficiency. It is specifically disclaimed by the majority party's representatives that the bill represents protectionists. Excepting the woolen and lumber provisions, which are special, there is simply a horizontal addition of 15 per cent. to the duties of a number of specified schedules. Various interests have rained telegrams upon the committee, seeking a special hearing, but every such proposal was refused and properly so. If the emergency bill is to be put through as a non-partisan measure, there can be no attempt to construct a logical bill, or one harmonizing with any party's principles. The 15 per cent. addition to the Wilson-Gorman schedules is simply a 15 per cent. increase in the revenues derived from a set of schedules that never represented either of the two parties, and has as its only excuse the fact that it raises more money. The tin-plate manufacturers are reported to have made some effort to right the injustice of a 1.2c. duty on tinned plates alongside a duty of 1.225c. on black plates; but this with other inequalities stands as before. An increase of 15 per cent. would give a tin-plate duty of 1.38c. or within .12c. of a figure that would be satisfactory to many manufacturers. The tin-plate imports of 1895 are likely to yield $5,000,000 in duties. The proposed increase would give $750,000 additional. Since the income tax feature of the Wilson bill has been disposed of by the courts there can be no dispute as to the insufficiency of revenues from that measure, and therefore the executive can scarcely argue that the proposed tariff bill is not an essential part of the emergency legislation which he has asked Congress to pass. He may, as has been suggested, allow this bill to become a law, should the Senate pass it, in the way he suffered the Wilson bill to become operative—without his signature. In any event, there will be a helpful rather than an unsettling result to industry, should the measure pass.

THE CLEVELAND DISTRICT.—Continued from Page 3

the wages they were getting earlier in the year when pig iron prices were about those of to-day. There have been some sales of foundry iron the past week, through Cleveland offices—for the most part to such regular customers of the selling firms as are in the habit of making their contracts in December. Here and there a sale has been made at guaranteed prices. Buyers are not anxious, but there are signs that many will place orders in January. We quote $13 at valley furnace for No. 2 and $13.50 for No. 1. Large contracts would shade these prices considerably.

Finished Material.

Buying is at a low eb'), as is to be expected in the last week of the year. Bar iron inquiries have been stimulated somewhat by the reduction to 1.25c, Cleveland, and it is evident that a large tonnage may be counted on for the early months of 1895. Steel bars are still from $1 to $2 a ton below the association price on iron, and on the latter there is still some cutting reported. In all finished material that goes back to the steel billet there is dullness. Rod, wire, and wire nail mills are feeble buyers. Some steel has been sold in the Cleveland district the past week at $17 delivered, the freight being 75c. A tin plate bar contract for 2,000 tons was taken here by the leading Western steel interest at $18.50 delivered. Beams, channels, angles and plates show li tle activity at unchanged prices—1.50c Pittsburg, for beams, 1.40c for angles and 1.50c for tank steel.

ENGINEERING WORKS ON THE LAKES.

At the regular meeting of the Engineers' Club of Philadelphia, on Saturday evening, Dec. 7, Mr. John Birkinbine presented a paper on "Notable Engineering Achievements in the Great Lake Region." The record of the meeting just issued by the club's secretary gives this interesting synopsis of the paper:

After exhibiting on the screen a map showing the proportions of the lakes as compared with eastern States, and reference to the fact that 3,000 vessels of total capacity of 1,250,000 tons float at elevations practically equivalent to the height of the statue of William Penn on the City Hall tower in Philadelphia, the various methods of mining pursued in the region of Lake Superior were discussed. Starting with the preliminary log cabin, the first winch was illustrated, then the shaft, and finally the operating mine. Similarly, instances of the steam shovel and milling system of mining on the Mesabi Range of Minnesota; the deep underground exploitations of the hard iron ore mines of Michigan, and of the copper mines were referred to. A diagram was also presented, showing the great depth to which mining operations have been carried on, and the relation of these to ocean level and to that of Lake Superior. Views of hoisting and pumping machinery, methods of timbering, a timber squeeze, man engine, ore pockets at the mine, etc., were illustrated and referred to, a number of flash light views taken underground by Prof. Denton, of the University of Minnesota, being part of the display. The docks from which ore is shipped, consisting of several hundred pockets with adjustable spouts were described, and instances given where 2,000 tons of iron ore were deposited in a boat within 45 minutes.

The "whale-backs," the steel canal boats, and other forms of vessels in use on the great lakes were discussed, and the facilities which they offer as means of transporting heavy freight referred to. The ore receiving docks on the lower lakes were then described. At these ore is handled from a vessel's hold after the buckets are loaded by stevedores and conveyed several hundred feet back from the water for a cent or less per ton. The coal docks, both for shipping and receiving coal and some of the special appliances were noticed.

In the matter of harbor improvements special attention was given to the artificial entry to the harbor of Duluth and of the new breakwater at Marquette. The latter is a series of "beton" blocks, each about 100 tons in weight, formed in place, but leaving alternate spaces of 10 feet between each block, which was subsequently filled in by similar blocks, this being done to prevent any local settlement disturbing more than one 10-foot section. The enormous shipment through the St. Mary ship canal was stated to have been 13,000,000 tons in the eight months in which navigation was open in 1894, and it will probably approximate 17,000,000 tons the present year. The statement was also made that the average distance the freight was carried by water was over 800 miles, and the cost slightly less than one mill per ton-mile. The growth of this canal was demonstrated by the fact that although in 1856 a lock 350 feet long, 60 feet wide and 12 feet deep was considered ample for a century, by persons then well versed in local progress, in 1880 a new lock, 515 feet long by 80 feet wide and 16 feet deep, was opened, and the congestion was so great in 1894 with this canal, that the average detention of vessels was over seven hours. A new lock, 800 by 100 feet and 20 feet deep, is now practically ready for service on the American side, while another lock on the Canadian side, 900 by 60 feet, will help relieve the congestion. These locks are to overcome the difference of level between Lake Superior and Lakes Michigan and Huron.

The Chicago drainage canal was then liberally illustrated, and facts concerning the 40,000,000 cubic yards of material handled were given. Among these was the average cost of rock excavation at 76 cents and dirt 22 to 28 cents per cubic yard. The material was largely handled, after the top lift had been removed, by means of cantilevers, cable-ways, or swing derricks, which met with favor in the order named—a cantilever costing, however, about $28,000, while a cable-way cost but about $12,000. Few of the contracting firms owned their conveying apparatus, most of the work being sublet to conveyor companies. Drills which have bored from 90 to 130 feet per day in the limestone rock through which the canal is cut, could penetrate but from 6 to 20 feet in the harder Lake Superior iron ores.

The propeller-pump used at Milwaukee to flush the river, by delivering about 40,000 cubic feet of water per minute, was illustrated. The improved methods of constructing vessels for the lake traffic, and the unique way of launching them sideways, also received attention and illustration.

The railroad tunnel under the St. Clair River was shown in section, and the statement made that during the season of navigation a greater tonnage passed through the St. Clair River than elsewhere in this continent.

The paper closed with a reference to the improvements at Niagara, and a statement that the engineering features of Lake Ontario and the canal between Lake Erie and Lake Ontario had necessarily been omitted, to make the description complete so far as the upper lakes were concerned, although it was not claimed that all of the remarkable achievements of the engineer had been mentioned.

Connellsville Coke Wages Advanced.

An advance in the wages of the Connellsville coke workers, ranging from 12 to 18 per cent., and taking effect January 1st, has been announced. Notices have been posted by all the large operators but one, and in this case it is to be expected that the same action will be taken before the end of the week. The new basis is as follows:

Rib and room mining coal, per 100 bushels, advanced from 90c. to $1.05; heading coal mining, per 100 bushels, advanced from $1.02 to $1.20; drivers and rope riders, from $1.84 to $2.05; cagers, advanced from $1.84 to $2.05; trippers, advanced from 50c. to 68c.; dumpers and tipplemen, advanced from $1.50 to $1.68; track layers, blasters and timberman, advanced from $1.75 to $2.05; charging engineers, advanced from $2.10 to $2.25; other chargers, advanced from $1.50 to $1.68; teamsters, per day, advanced from $1.40 to $1.55; carters, per day, advanced from $1.25 to $1.40; car forkers, over 40,000 capacity, advanced from $1.10 to $1.25; forking, 40,000 or less, advanced from $1.10 to $1.25; forking large open top, advanced from $1.25 to $1.40; forking medium and small, advanced from $1.10 to $1.26; drawing, per 100 bushels, advanced from 50c. to 60c.; leveling, per oven, advanced from 9c. to 10¼c.

THE Spearman furnace, at Sharpsville, Pa., is still inactive, the men demanding the discharge of three fillers.

COWPER STOVE WITH SPECIAL BRICK.

The annexed illustrations are of a Cowper fire brick hot blast stove, lined with a special checker brick patented by Frank C. Roberts, of Franck C. Roberts & Co., Philadelphia. Fig. 1 is a sectional elevation of the stove; fig. 2 is a plan showing half plan at the bottom, and a half plan through the middle of the stove; figs. 3 and 4 show the special brick and method of flue construction.

As indicated, the special brick are so made and laid that they interlock with each other, thus forming a regenerative structure in which each brick is held rigidly in position. Referring to fig. 4, the brick are so proportioned that no contact takes place between the adjacent brick at points A and D. The clearance at A is provided in order to insure close contact between adjacent bricks at points C and B whereby the brick are held rigidly in position; the clearance at D is provided in order that no weight of superposed brickwork shall rest on the projections at the ends of each brick. These brick are made preferably three inches in thickness and nine inches deep, the flue openings being nine inches square.

This design of hot blast stove gives a much greater heating surface with a considerable less quantity of fire brick than is the case with most designs. Below is given the heating surface in three sizes of stoves:

One stove 16′ 0″ diameter	70′ 0″ high	16,900 square feet.
One stove 18′ 0″ diameter	70′ 0″ high	22,900 square feet.
One stove 21′ 0″ diameter	83′ 0″ high	37,400 square feet.

Cowper stoves lined with Roberts' brick have been built at the plant of the Penn Iron & Coal Co., at Canal Dover, O., and at the plant of the Cleveland Cliffs Iron Co., at Gladstone, Mich.

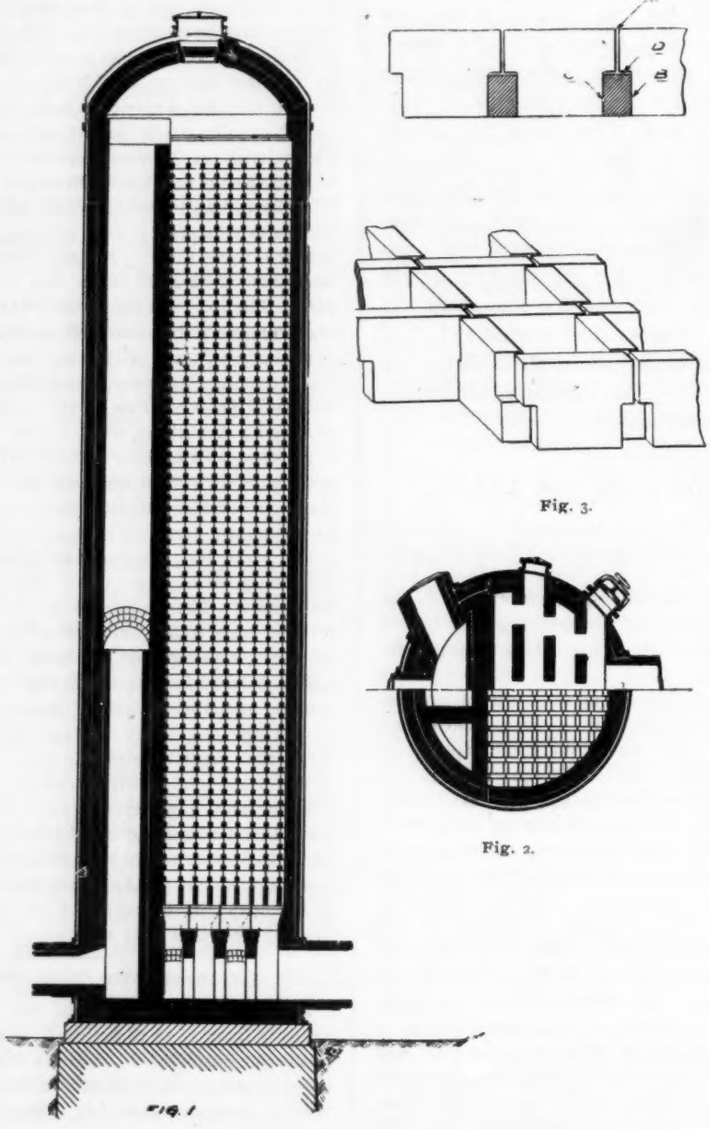


Fig. 4.

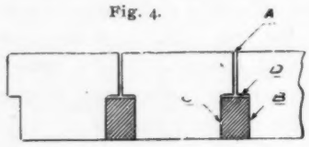


Fig. 3.

Fig. 2.

COWPER STOVE WITH SPECIAL BRICK.

AT the Spearman Iron Co.'s furnace, Sharpsville, Pa., the employes went on a strike Dec. 23, leaving the furnace in bad shape. The trouble was over the employment of fillers from Pittsburg, to take the place of men who, the management state, were responsible for the bad working of the furnace.

THE dynamite treatment was successfully applied to a "hang" in the Sharon Iron Co.'s furnace at Sharon, Pa., by Manager Frye. The first charge was 1½ pounds. This was increased until a charge of nearly 10 pounds was exploded in the stack. The plant was not damaged, but the desired result was attained, the hanging and chilled stock being broken up and precipitated to the lower part of the stack, where the blast readily reduced it. The same treatment had been successfully tried a short time before by Manager Raeber at one of the Wheeler Furnace Co.'s stacks.

THE Champion Rivet Co., of Cleveland, is putting in, as an addition to its works, one of the largest rivet-making machines manufactured. With this equipment the company will be able to furnish rivets up to 1¾″ in diameter. Particular attention is being given by this concern to steel rivets for marine boilers.

AN explosion at one of the Shoenberger Steel Co.'s furnaces, Pittsburg, Dec. 23, fatally burned two employes and severely burned five others.

ELECTRIC MOTOR IN MILL, MINE AND FACTORY

BY E. L. HEINRICHS.

As the application of electric power is being more and more developed, its utilization for driving machinery is becoming so general that to-day there are few branches of manufacturing where the electric motor does not do the work which was formerly monopolized by the steam engine. In some instances, in fact, electric power has been found capable of doing work where the employment of the steam engine was altogether out of the question.

While the electric motor is not a recent invention, its commercial usefulness has not been largely developed until recently, except in the shape of the fan motor, or as the motive power for street cars. Its introduction into the latter field gave it the desired impetus, because electrical men awoke to a better realization of its possibilities, if perfected, in other fields. The result has been that to-day we find the electric motor in the printing establishment operating the printing press, the binding machine, the folding machine, etc. In the flour mill the electric motor operates the crane, which carries the grain to the hopper, from which it is poured into the mill turned by the electric motor.

In machine shops one can make similar observations. The raw material is handled by electricity, tooled by boring mill, planer or lathe driven by electric motors, until the finished article is at last lifted by the electric crane into the freight car ready for shipment. In some of the largest rolling mills in this country the manufacture of iron and steel is almost literally accomplished by electric power. At the Homestead mills of the Carnegie Co., rolls are operated by electric motors, with results far in excess of anything anticipated and with the additional advantage of materially reducing the cost of labor in rolling beams and other material.

In the Charleroi Plate Glass Works, at Charleroi, Pa., one of the shops was recently equipped with electric motors, and to-day the manufacture of plate glass is almost entirely accomplished by the aid of electric power, at least as far as this factory is concerned.

The elevator business of this country has been practically revolutionized by the introduction of the electric motor. For a long time it was deemed impossible for anything to supersede hydraulic power for this work, but a number of competitive tests conducted not long since at the instance of some of the largest elevator manufacturers have established the superiority of the electric motor for the operation of elevators beyond a question.

Of course it must be patent to every one that the use of the electric motor has wonderful advantages, or its introduction would never have grown so rapidly. In the mills and factories it has done a great deal as a labor-saving appliance. As a propeller of electric cars on street railways, it has opened a channel for investment, which has nearly always proved profitable, besides having completely changed the entire system of American rapid transit. These are some of the practical benefits derived from the use of the electric motor. But looking at it from an æsthetic point of view, the fact that this wonderful little machine has also done away with a great deal of smoke, soot, steam and dirt in manufacturing establishments is a feature that deserves favorable mention.

Nevertheless, with all the ramifications and revolutions accomplished already by the electric motor, the field of its usefulness has only commenced. When Tesla invented his alternating current motor, some ten or more years ago, perhaps no one, not even the inventor himself, had any idea of the marvelous possibilities contained within that simple piece of electrical apparatus. The electric motor, as we now generally know it, is operated with a direct current, which of course necessitates the use of commutator and brushes. These appendages of the motor are its only objection, because they require attendance. Now the alternating current motor, being constructed without them, can be run day in and day out without requiring the least attention during the entire time it is in operation. While the perfection of the Tesla motor in its simplicity of construction and its easy operation fills the requirements of the users of electric motors, the introduction of the Tesla polyphase system of electrical power transmission has been followed by absolute commercial success.

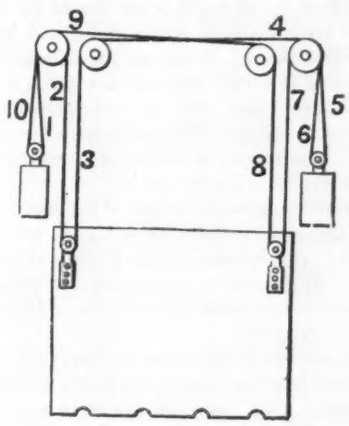
As is well known, it is not so very long ago when it was still the general practice to use separate circuits for distributing electric light and power. The many objections to such a method are obvious, cost of operating the plant being the main disadvantage. In the polyphase system all these obstacles are overcome. It is entirely practicable to operate incandescent light, street car, arc light and any power circuit from the same generator; in fact so flexible is this system that high tension, low tension, alternating or direct current may be obtained from the same source of power, and power may be transmitted for very considerable distances in an entirely commercial manner.

That herein lies the practical solution of the question of utilizing electric power in machine shops, mills, mines and factories is now generally understood, and the demand for this kind of apparatus has been wonderful of late.

When, as is now the case, the mill owner, the iron and steel manufacturer, the mine owner, or the factory proprietor can be convinced by practical demonstration, that he may concentrate the power for lighting his works and operating his machinery in one power house, and obtain the power from one electric generator, it will not take these men long to come to a decision as to what they ought to do.

For Core-Oven Doors.

The Straight Line Engine Co. has its core-oven doors counter-weighted in a manner which insures both sides going



together without guides, as shown in the figure; the ropes being strung in as is indicated by the numbers.—[*Machinery.*

An Effort to Tax Manufacturers' Due Bills.

Two well known Ohio concerns, Russell & Co., of Massillon, and the Wrought Iron Bridge Co., of Canton, have been in communication recently with internal revenue officers of the government relative to the notes issued by these firms in 1893 and given as pay to their men. It is contended on behalf of the government that these notes, or scrip, are taxable at 10 per cent. of their face, under the statute relating to notes going into general circulation. It would appear from the developments in these cases that the firms in question were well advised as to the steps they took and do not expect the claim of the government agent to be confirmed by the court. President McClymonds, of Russell & Co., says: "We were fully conversant with the law when our notes were issued, and acted knowingly in every step we then took. The paper upon which the collector desires to tax us 10 per cent. was all in the form of a promissory note, and none of it went into general circulation. We paid our employes with these notes, and when they passed out of their hands by the ordinary operations of business they were returned to this office and consolidated, a new bankable note being exchanged therefor. Not one of these notes was ever reissued."

THE American Pig Iron Storage Warrant Co. had in yard Dec. 10, 107,600 tons of iron. In the next 10 days none was added and withdrawals were 700 tons, leaving stocks on Dec. 20, of 106,900 tons.

G. W. MENOUGH & BRO.'S foundry at Wellsville, O., burned Dec. 25. Loss $11.000; insurance $4.000.

THE LEWIS INGOT "ACCUMULATOR."

Christopher Lewis, of Lorain, O., who has had an experience of 30 years in iron and steel works of the United States, has perfected an invention which will be of general interest to steel manufacturers. The following description, prepared by Mr. Lewis for the readers of *The Iron Trade Review*, gives in detail the features of his improvement:

"To those who have made a study of steel manufacture it is needless to say that the ingot as it comes from the converter, with the sulphur and phosphorus largely eliminated, and carbon substituted, to qualify it for the purpose desired, is a homogeneous bulk of metal as near perfect as science and skill have been so far able to make it. It is, therefore, to its treatment from the time it is formed in the mold until it is finished into a shape or plate, for armor and other purposes, that I desire to call the attention of those who are interested in steel manufacture.

"When the mold is removed from the ingot, the latter being exposed to the cold air, of course contraction begins at once, while expansion is as actively at work from the molten metal in the center of the ingot. One of the evils arising from a conflict of this kind is the loss of a large amount of heat which must be re-created before the ingot can be rolled into a shape or plate of any character. This, under the present system, is supplied by gas in soaking pits or heating furnaces. If through improper combustion, or unequal distribution of heat from it, the ingot is not heated in all parts alike, the shape or other material made from it will be imperfect to a greater or less extent. When an ingot passes through the rolls, if one side is hotter than another, the hot part will draw faster than the cold one, and in consequence the bloom will turn and twist by rolling. This produces a fracture in the fibre of the steel. Continuous working increases the damage, until the shape is wholly or partly spoiled.

"Another evil is, that the center of the ingot being so much hotter than the outer surface, the soft part will buckle in the rolls by being crowded together in a lump which the rolls refuse to take. As a result of the instant stopping of the rolls, while the engine continues forward, the rolls being weaker, break.

"With the sudden contraction of the ingot from exposure when the mold is lifted from it, the pores of the outer surface become closed. This prevents the escape of a large amount of sulphur and gas, which is carried to the center when poured, and this can only be eliminated by the manipulation of the "bloom" in the rolls. Its escape then rarely occurs without serious damage to the shape or plate being rolled. The unequally heated ingot also requires a large excess of steam power to drive the rolls, and adds largely to the wear and tear of rolls and machinery. These evils, arising from the unequally heated ingot, come from causes almost beyond human control. Further, if a number of ingots are placed in a soaking pit they will generate heat from each other, consequently the two surfaces which are not confronted by the surface of others, will not contain the same amount of heat, and to that extent will be much more difficult to mold into shape in the rolls. Another cause for an imperfectly heated ingot is the human element in the operation. No matter how skillful a man may be as a workman, it requires something more reliable than the judgment of man to determine the proper working condition of steel. "To err is human," and in this case as in many others, it has been demonstrated beyond question that natural or mechanical means are the only safe and reliable methods by which difficulties of this character may be profitably and successfully overcome.

"For the evils above enumerated, I offer a remedy which is inexpensive, effective and infallible. It will do what the most skillful mechanic is unable to do. In the first place, it will utilize the necessary amount of heat concentrated in the ingot when it is formed in the mold. It will prevent the loss of heat from exposure of the outer surface of the ingot to the cold air, and instead of employing means to supply an unnecessary heat, it will employ the surplus from the center of the ingot and thus make the heat uniform in all parts. It will save an immense amount of steam power to roll the steel. On extracting the heat from the center, it will open the pores of the steel and thus eliminate the sulphur and gas. By giving to the ingot a uniform heat, the steel will work evenly and smoothly, preserving the fibre in a sound and uniform condition. It will prevent the steel from buckling, and thus save a jerk or "backlash" so called, which ends almost invariably in breaking rolls. It will save an immense loss in short and defective shapes and plates. It will increase largely the outer surface or skin of the ingot, thus adding to the wearing of shapes and to the resisting powers of armor and other plates. It will dispense with soaking pits and furnaces, and all the expenses incident thereto. In short, it will reduce the outfit of a steel plant to a converter and a finishing train of rolls.

"To accomplish these ends I use a shell of wrought iron or cast iron which I denominate an accumulator. I put it over the mold before or after the ingot is poured. When the ingot has been taken off, I put on the cap of the accumulator. The accumulator and cap are lined with fire brick, 4½ inches or more in thickness. A space of six or eight inches intervenes between every part of the ingot and the accumulator, this being sufficient space to retain the heat which is generated from the center of the ingot. In this way the heat that the ingot already contains will be utilized for the purpose of giving a uniform heat to all parts of the ingot. A valve is provided for the escape of the gas and sulphur, as they are drawn from the center. An indicator may also be used if desired, by this means the ingot will be kept confined until heat has been equalized sufficiently to permit of rolling."

Lake Superior Iron Mines.

Maj. M. W. Burt, of Ironwood, Mich., has been appointed superintendent of the Zenith mine on the Vermillion range, acquired last summer by C. Morris, James Corrigan, and Frank Rockefeller, of Cleveland. Pumping is now in progress. There is reason to believe that the Chandler vein extends to the Zenith.

Exploration work on the Mesabi range is being vigorously pushed, especially in the already famous 58-17. Its southern sections show the greatest activity. The *Mesabi Range* says: "Besides the several finds by the Rouchleau-Ray Iron Land company, and the recent discovery of a large body of high grade ore south of the Fayal by Neil McInnis and D. T. Adams, it is learned that R. H. Palmer has made a strike on section 34, 58-17. He has four pits in ore, and estimates that the ore body is 900 feet in length by 300 in width. Assays of the ore show 65 per cent. iron and low phosphorus content."

Joseph Pope and James Billings, practical mining men, have taken an option on the old Indiana mine, near Iron Mountain, Mich. Recent analysis of the ore show 56 in iron and .01 in phosphorus. The mine shipped 18,000 tons in the few years preceding 1888.

The shipments of the Pewabic mine this year were 262,746 tons, or 41,000 tons less than in 1894. The Commonwealth, another Menominee range shipper, made an output of 210,696 tons this year.

Personal.

James H. Dalliba, of New York, assistant to the president of the Lackawanna Iron & Steel Co., has been in Cleveland the past week.

John Barnes, superintendent of the Empire Boiler Cleaning Co., New York, was a Cleveland caller this week.

Frank Huck, superintendent of labor at the Carrie Furnace Co.'s furnaces, Rankin, Pa., has resigned his position. Henry Croft, of Swissvale, Pa., is his successor.

"WATER-WAYS from the Ocean to the Lakes" is the title of an important article in the January number of *Scribner's Magazine*. It is by Thos. Curtis Clarke, the well-known engineer. He combines figures and arguments to show that it is possible to move profitably a great bulk of freight in steel barges towed by electricity. President Andrews' history is to run through the first four numbers of the new year. His January instalment deals with President Cleveland's first administration. The "Field of Art" and "About the World" departments are especially interesting.

A SHARON, Pa., dispatch says that work will begin this week on buildings that will double the capacity of the American Steel Casting Co.'s plant there. Over 100 more men will be employed.

THE BLOXHAM BOILER.

The boiler whose construction is indicated by the accompanying cuts is designed with the object of making every part accessible to cleaning and repairs with the least possible labor. As will be seen, the construction is entirely of the common boiler maker's practice, therefore requiring no special tools or men to make repairs or fit it up. Fig. 1 is a front sectional elevation and Fig. 2 a side sectional view. Experience has shown that it is not possible in water tube boilers to stop the feed pump for any length of time while the boiler is at work. It will be seen that the feed pipe enters the large circulating pipe at the point marked O, this circulating pipe being very much larger than the tubes and, having feed water injected into it, the water in it is colder than in any other part of the boiler. It must therefore pass to the lower drums through the connections 1 and 2. It then passes to the rear end of the bottom drum and up into the drum marked 2 above Fig. 2 at the rear end, through tubes to the front end of the second section of drums; then up into the third drum. There not being a great deal of heat in the top section, the inventor has left both ends open to the steam drum. The top of the large circulating pipe is supposed to be placed about 1″ or 2″ above the water line in the steam drum, thereby taking all the scum around with the circulating water, which will be deposited more or less in the dead leg at the rear end of the boiler. The bottom drums are to be entirely surrounded by the brick work. The section above need not be covered all over. The object of covering the bottom one is, that this drum can contain 2″ or more of sediment with no resulting harm. There is a small 1½″ blow pipe from each bottom drum connected to the bottom of the 8″ pipe at the rear of the boiler.

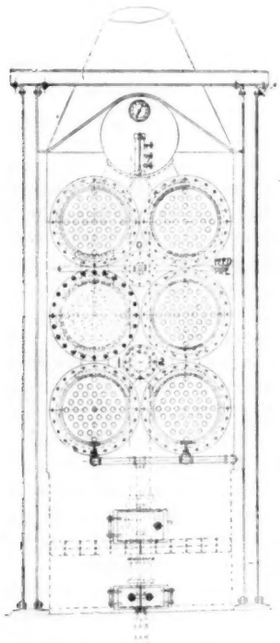


FIG. 1.

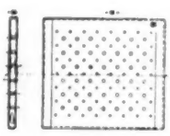


FIG. 3.

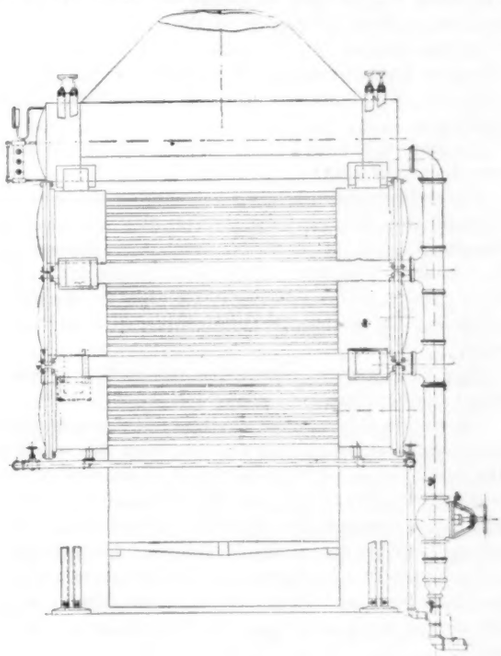


FIG. 2.

THE BLOXHAM BOILER.

The heat from the furnace comes in contact with the tubes and tube sheets only. The tubes are expanded and beaded in the water end of the drums. The boiler can be erected entirely and hung up in place, the brick work being built around it afterwards.

In connection with the boiler a feed water heater has been arranged to take the place of brick side walls. This is shown in Fig. 3, consisting simply of water boxes through which the feed water passes before entering the boiler. They will act not only as a feed water heater, but a great deal of sediment will be deposited in them and can be readily cleaned through small hand holes on the bottom corners.

Concerning the impression at first glance, that there are too many parts, the inventor suggests that trouble is never thought of, with a dozen cylinder heads of steam engines, which may be hot and cold two or three times a day. The heads are to be faced joints with a small dove-tailed groove into which may be inserted a small band of ¼ inch square rubber or other packing. The tubes in one section of this boiler can be removed in one day by a boiler maker and helper, and new ones put in at a cost of about $75. It thus appears that repairs can very readily be made to vital points. The two bottom sections are placed two inches lower on the front end than at the rear. The designer is W. Bloxham, of 217 Thurmond street, Atlanta, Ga.

Changes in Machine Tool Companies.

William Lodge, the founder of the Lodge & Davis Machine Tool Co. has sold his interest in that company, and will devote his attention entirely to the Lodge & Shipley Machine Tool Co., of Cincinnati. This company manufactures a line of engine lathes from 12″ to 42″, and chucking lathes from 12″ to 48″, 16″ and 22″ screw machines, and has recently brought out a massive screw and bicycle hub machine, weighing 4,500 pounds, and taking 2 7-16″ stock through the wire feed. It is running its plant until 10 o'clock each night and is crowded with orders, sufficient to keep its entire force employed for several months to come.

Chas. Davis, of the Lodge & Davis Machine Tool Co., Thos. P. Egan, president of the J. A. Fay & Egan Co., Robert, Laidlaw, president of the Laidlaw-Dun-Gordon Co., and Thos. McDougall, a well known Cincinnati attorney, have bought the stock in the Lodge & Davis Machine Tool Co. heretofore held by William Lodge, Samuel Lodge and Mary Lodge. This terminates a long contested legal controversy. The new officers of the Lodge & Davis Machine Tool Co will be: Chas. Davis, president; W. H. Burtner, vice president and treasurer; B. B. Quillen, secretary. The Lodge & Davis Machine Tool Co., the J. A. Fay & Egan Co., and the Laidlaw Dun-Gordon Co. operate their own stores in all the principal cities of the country; and under the new arrangement it is probable that these will be consolidated to curtail expenses.

Standardizing Structural Shapes.

The manufacturers of structural steel have made progress in the effort now making to agree upon standard weights and dimensions for beams, channels, etc., but agreement has not been reached as yet. Independent of this movement, some makers are announcing a curtailment in the number of weights they will roll. The Carnegie Steel Co. some time ago announced that it would not roll intermediate weights of channels hereafter, but would confine its product to standard weights for 9″ channels and above, as follows:

9″	14, 15, 20 and 25 lbs. per foot.
10″	16.5, 20, 25, 30 and 35 lbs. per foot.
12″	20 25, 30, 35, 40 and 45 lbs. per foot.
15″	33, 35, 40, 45, 50 and 55 lbs. per foot.

A 900-ft. addition will be made to the Duluth & Winnipeg ore dock at Superior.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association, was held at the Great Northern Hotel, Chicago, Wednesday evening Dec. 18. The President, Jno. M. Sweeney, occupied the chair.

Those present were the following: John M. Sweeney, A. L. Bowen, Chicago Consolidated Iron & Steel Co., Harvey, Ill.; John Pettigrew, Illinois Steel Co., Joliet, Ill.; A. W. McArthur, Rockford Foundry Co., Rockford, Ill; J. Bowie, Walburn Swenson Co., Chicago Heights, Ill.; Wm. L. Wilson, Cleveland Facing Mills, Cleveland, O.; C. A. Sercomb, Schwab & Sercomb, Milwaukee, Wis.; Jas. Frake; E. E. Hanna, Wm. Ferguson, Gates Iron Works; A. Sorge, Jr.; O. T. Stantial, W. L. Lukens, Illinois Malleable Iron Co.; D. L. Cobb, Sloss Iron & Steel Co.; H. F. Frohman, S. Obermayer Co.; A. M. Thompson, O. H. Barry, Link-Belt Machinery Co.; H. S. Vrooman, Garden City Sand Co.; H. L. Hotchkiss, Deering Harvester Co.; Ed. Welch, J. W. Hughes, Weir & Craig Mfg. Co.; A. J. Oehring, Western Electric Co., Cleveland; R. C. Barr, Cleveland & Barr; C. H. Hopke, Western Foundry Co.; H. Arnison, Jas. S. Winn, Ward & Nash; J. D. Young, Armour Institute; P. S. Dingey, in charge of foundry, and C. F. Friese, in charge of machine shop of the English High and Manual Training School; S. T. Johnston, F. A. Rundle, Whiting Foundry Equipment Co.; W. T. Hony; P. L. Sutton, L. Wolff Mfg. Co, and B. M. Gardner, *The Iron Trade Review*, all of Chicago.

On motion, the reading of the minutes of the last meeting was dispensed with.

The following applications for membership were presented: Gibson Iron Works, Gibson City, Ill; Aurora Iron Works, Aurora, Ill.; P. H. & F. M. Roots Co., Connersville, Ind.; C. J. Hodge, Houghton, Mich.; J. E. Porter & Co., Ottawa, Ill; T. P. Kelly & Co., Chicago; Chicago Pneumatic Tool Co., Chicago. On motion, the applicants were elected to membership.

The headquarters committee reported progress and was given further time.

On motion of Mr. Frake, chairman of the by-laws committee, the association went into committee of the whole to discuss the new by-laws as reported by the committee. Mr. Hanna was called to the chair. On the rising of the committee, the chairman reported the by-laws as amended. They were adopted and the committee discharged. The principal changes are the provision for three classes of members, active, associate and honorary; and for an editing committee to secure papers for the meetings, and to edit all the publications of the association.

On motion of the chairman, Mr. Stantial, the committee on test bars was discharged from further consideration of that question.

The paper of the evening was then read by its author, Mr. P. S. Dingey. It is as follows:

Care of Patterns and Pattern Account.

Every firm, large or small, should have some system for keeping patterns in good order; generally, one, two, three or more men (according to size of works) are delegated for that purpose and held responsible—many firms do this but do not cover ground enough.

By good order generally is meant from the time a pattern is made until it is no longer fit for use. To ensure this there must first of all be a system of making patterns so that they may be recognized by their mark, rather than depend entirely upon a name for reference. Whether it is best to mark with number or letter, or with both number and letter, are points open for discussion, but I have been accustomed to the latter and have found it very convenient for classifying work, the letters being used for that purpose. The marking, of course, is done in the usual way by fastening pattern letters on the patterns and stamping every loose piece and core box belonging to the pattern correspondingly. This is done by every firm making any pretentions to order, but needs to be emphasized because there are so many who do not, and because it is one of the first requisites toward keeping patterns in good order. In connection with the marking or symbolizing of patterns, a pattern record book must be kept, into which every pattern for each machine is entered, no two being marked alike. The book should be ruled for the purpose and heading printed at the top of each column, indicating its use.

SPECIMEN ENTRY FOR PATTERN RECORD BOOK.

Small Test Cupola.

Shell 27" outside diameter.

1	2	3	4	5	6	7
Pattern mark.	Name of part.	Castings wanted.	Rough weight	Finished weight.	Pattern at	Remarks.
	Cast Iron		Lbs.			
A— 1	Foundation plate	1				
A— 2	Standards	2				
A— 3	Caps for plate	2				
A— 4	Upper ring for shell	1				
A— 5	Lower " " "	1				
A— 9	Trunnions	2				
A— 7	Drop door	1				
A— 8	Tuyeres	2				
A— 9	Slag spout	1				
A—10	Front spout	1				
A—11	Tipping bar	1				
A—12	Bracket for support Etc., etc	1				
A—30	Cast steel					
A— 50	Brass					

SPECIMEN ENTRY FOR PATTERN RECORD BOOK.

Index of firms to whom patterns are sent.

1	Chicago Hardware Mfg. Co	Chicago,	Iron.
2	Fraser & Chalmers	"	"
3	Tarrant & Ramsey Co	"	"
4	Whiting Foundry Equipment Co	"	"
5	R. M. Eddy Foundry Co	"	"
6	The Sargent Co	"	Steel.
7	Pittsburg Steel Casting Co	Pittsburg, Pa.,	"
8	Eureka Cast Steel Co	Chester, Pa	"
9	Solid Steel Casting Co	Alliance, O.,	"
10	Thomas Bros. Mfg Co	Chicago,	Brass.
11	E. Smeeth's Brass Foundry	"	"
12	J. J. Ryan & Co	"	"

A form of entry which I found to work very satisfactorily at the M. C. Bullock Mfg. Co., of this city, some years ago, is shown by the ones prepared. Column No. 3 shows the number of castings required from each pattern to complete one machine. Though the weight columns have nothing to do with the care of patterns, they will be found very useful for reference. In connection with column six an index is prepared, giving the names of firms to whom patterns are sent, each firm being given a separate number. When a pattern is sent out the number corresponding to the firm is placed in the column with lead pencil, and when returned the mark is erased. This is about the most simple method for keeping track of patterns I know of. In addition to putting down the numbers of firms in this column, the date at which the pattern was shipped may also be inserted; this last item has settled and prevented many disputes in my experience.

Much more might be said on this first requirement towards the proper care of patterns, that is the marking—but it is only intended to touch one or two points, enough to invite discussion.

Let the storage be the second consideration, and in considering it I would say first, give the patterns plenty of room, so that they may be seen when wanted, and though the space occupied may be valuable, it will be found to pay in the end. I believe manufacturers grudge space for pattern storage more than for anything else, hence the usual piling up and burying patterns out of sight.

In most places the light is not too good, and should not be obstructed—a liberal space and good light are most essential in keeping patterns in good order, so as to enable them to be found when wanted.

If a letter has been used to designate a certain set of patterns (of an engine for instance), let the shelf on which the patterns are stored be marked with that letter.

Only those in charge should hand patterns out or put them away, adopting some such method as when tools are handed out from tool room, for what is a pattern but a tool. Patterns that are of no use as patterns any longer often occupy valuable space when they might just as well be used to start the cupola.

For the third point, let us suppose a pattern has found its way to the foundry; now it will not get quite so much nursing and must be prepared to receive hard knocks—many patterns expire before their time from injuries received in the foundry, having been sent there without rapping or draw plates in them, and as the molder has to get the patterns out somehow, he is not to blame when the pattern is damaged through

lack of proper appliances for drawing it. It is a good thing when draw plates are put in patterns, to screw them to the bottom, instead of on top of patterns, thus preventing screws and plates from being pulled out, or when patterns are, to use a shop phrase, "boxed up," to put the plates on the inside while building.

Molders, as a class, have the reputation of being very careless with patterns. The statement, however, needs to be qualified, for I have seen many patterns which should be given no quarter—new patterns, too, finished up fit for a piece of parlor furniture, can see your face in them, but when a molder has rammed one of them up, and pulled it out of the sand, looked at his broken mold, then at the pattern with the sand sticking in the corners and to the beautiful varnish, he is not likely to feel very kindly toward it and is more likely to abuse that pattern than take care of it. I would not abuse it a bit.

Again there are other patterns which are made to mold and will hold together with ordinary usage for a long time; this kind should be always taken care of by all, but they are not. Take for instance what may be considered a trifling illustration—one molder, immediately after drawing a pattern, will take out the draw spike, wipe off the water from the top, and after brushing it, will lay it aside in some place where it will be free from kicks and other floating dangers in a foundry. Another molder draws his pattern, throws it aside, in the gangway, on the sand heap, anywhere, and will leave it soaking in the water he has drenched it with, and turning to patch up his badly rammed mold, calls the pattern all kinds of fancy names—such is the difference in molders as to their care of patterns.

When there is an order for a large number of castings from a wood pattern it is well to send it to the pattern shop occasionally to be over-hauled and varnished; foremen should watch this and not allow the molder to make "just a few more."

Among the so-called small evils which shorten the usefulness of a pattern are carelessly pushing the vent wire into the cope side, thereby making countless small holes and spliting off edges—paring dowel pins with a jack knife—leaving the pattern in the sand over night—allowing any kind of a helper to handle it, when it should only be done by men accustomed to patterns.

When an order is filled, notice should be sent to the man in charge of the patterns, at the same time it is sent to the office, so that he may have the pattern with all its parts and core boxes gathered up and removed from the foundry as soon as possible, for the ordinary foundry is not a good place to store patterns. It not only pays to have men whose business it is to watch and attend to the patterns, but it also saves much annoyance and worry. The taking care of patterns is a subject that may be profitably discussed without much fear of exhausting it, and considering the close relation of patterns to the foundry, the making of them might also be discussed in these meetings without being out of order, in fact it would suggest many points in molding that perhaps would not otherwise occur to us.

How patterns shall be shown as an asset, is a subject I scarcely dare touch because of its complications—the subject needs to be carefully considered, as the cost of a pattern may not represent its value; in fact, as already stated, a great many patterns are only so much kindling wood, but firms do not like to destroy them, as the week after something may come in for which the pattern may be needed. At the same time its value as an asset may be very small. Contracts for machinery for which an estimate has been given usually include the cost of pattern work; in such case, therefore, we may say the patterns are paid for. The question occurs, ought such patterns be reckoned as an asset? Standard patterns in a line of business might be estimated at actual cost, minus a certain percentage for depreciation; other patterns, that may or may not be wanted, should be estimated at a lower figure. Experimental work should not enter into the estimate of the value of a pattern, nor should repairs. Supposing a firm built locomotives, it would be quite proper to figure the locomotive patterns at say 75 per cent of cost—while patterns say of a pump might be considered quite high at 25 per cent; if the firm built pumps and only occasionally a locomotive, I would reverse the above.

It is important that the value of patterns be correctly estimated, so that the insurance should not be heavy, for to be heavily insured in the patterns is very unprofitable, unless a fire be looked forward to as a good thing

Discussion.

Mr. Pettigrew: Mr. Dingey says that patterns should be removed from the sand every night. What are you going to do if you have a large pattern that will take a week to mold?

Mr. Dingey: I meant those patterns that are damaged by leaving in the sand over night. Of course, if a man is molding in loam or very large dry sand, and is using a pattern for that one purpose, it is hardly possible to get it out of the sand.

Mr. Pettigrew: There is one thing I have noticed about patterns lately, and that is that since some of this patent glue has been used on them, it is a hard job to keep them together any length of time, especially when they are subject to heat and cold and dampness so that it would affect them; they fall to pieces. I think that one good thing that could be done about patterns is to use a sort of glue that would hold together under any conditions.

Mr. Sorge: I think there are a number of things suggested in the paper that are worthy of papers in themselves. But passing over the whole of this matter of the old patterns while they are in the foundry and while they are in the store room, the last two paragraphs of the paper refer to estimating upon the patterns as an asset of a plant. It is a subject which, as the writer states very correctly, is very important, and is a difficult one. I notice that he says that it is important that the value of patterns be correctiy estimated. Who is going to do the estimating? Whose word is going to be good for it that the estimate is really a true one and represents true values? Now it appears to me there is only one value, one true value to anything, and that is its earning capacity. The earning capacity of a piece of machinery, of a pattern, or of any other article is certainly the thing that determines its value. And I believe that is the only basis on which you will ever get a true valuation of patterns, for the use of the insurance as well as for the use of your inventory. The thing can be arrived at. It is somewhat of a process to get at it, but you can arrive at it by the value of the product produced by these patterns in a given time, in other words by the profit obtained from the castings, due to the superiority or the inferiority of the patterns supplied. It is rather a long question I think that you have got in here. I have given the matter a good deal of thought, and hope some day to come out with it. Don't know when it will be, in the dim distance, I suppose. I don't believe, after the thing is studied out, that any estimate placed on a pattern by any individual is one that will be accepted as true and correct by all the others. But I believe that the moment you make the earning capacity, the net earning capacity, understand, the basis of your valuation of your patterns, that moment there can be no cavil with that valuation.

Mr. McArthur: I would like to ask Mr. Sorge a question. For example, if a man has a set of engine patterns and, we will say, he makes $100,000 worth of engines from those patterns in a year, at a profit of, say, $20,000, what would you count the value of those patterns in that case?

Mr. Sorge: Well, it is rather a difficult problem to answer. It is not impossible of solution. I would like to show it to you solved. I think I solved it in a way that there will not be much cavil about. I base it upon this: A casting has a certain value, market value; it has a certain cost. The difference between the two is the profit on that casting. In the cost I expect to include all labor, material and expense; and in expense I expect to include what might be called the probable insuring value of the good will of the business. That is, there is a certain percentage that the good will of the business depreciates unless constant effort is used to keep the business at its highest state of efficiency, and for that depreciation a certain valuation wants to be put into the expense acconnt; that is, you want to keep a sinking fund so that if the effort, the high grade effort which you perhaps have in your business is not always available, then within a given time to be determined by statistics, your business shall have returned to you its full good will valuation by the time it becomes valueless. That should go into your expense account and should be taken from the profit. You obtain thereby the absolute net profit. I hold that the pattern shop is entitled to a share in that profit as well as the foundry, just as well as later on when that

machine is finished and you have the total net profit after going through the machine shop, the machine shop and the foundry are entitled each to a share in that profit. So also the pattern shop is entitled, because a portion of the effort to produce this machine was made in the pattern shop. The relative amount of the profits assignable to the two departments, foundry and pattern shop, I think will be fairly in proportion to the amount of labor expended in each, assuming that both are at an equal point of efficiency. Now, then, the moment you obtain that, that moment you ascertain the fair net profit assignable to the pattern shop. Then capitalizing that fair net profit at the ordinary rate of interest, you obtain a valuation for the pattern which is one that cannot be questioned by your insurance men or anybody else, because that is what those patterns will earn for you in net money.

Mr. Hanna: I want to take issue with Mr. Sorge on the valuation of a pattern. It seems to me that the value of any commercial article is simply what it can be reproduced for, regardless of what it will earn. I think a pattern would be no exception, and when it comes to figuring the earning capacity of the pattern as part of its value, I am afraid the insurance people would make trouble with us. Of course, there are some things, probably a Chicago street railroad franchise, that would be valued otherwise than at the amount for which they could be reproduced. I don't know about that, either. But it seems to me that is the proper way of putting a value on anything, any tool, any article of commerce, at what it can be purchased for in the open market, what it can be built for, labor and material and incidental expenses included. When it comes to putting a valuation on patterns it would seem to me that the actual first cost account is the thing to be taken into consideration, with an estimate of the probable life of this pattern. Knowing how many castings had been made from this pattern, then you must estimate how many more may be made until the pattern is useless and has to be reproduced, that is my idea.

The Chair: I want to ask, if in case the cost of the pattern has been charged in the cost of the output, and thereby paid for, would you give a value to the pattern as an asset?

Mr. Hanna: If it is a pattern of a standard article of manufacture, something that will be used every day, I most certainly should give it a value. If it is made for a machine that is to be built but once and was paid for at that time, it is kindling wood.

The Chair: Suppose a new part were ordered for a machine; make the pattern over again?

Mr. Hanna: Yes.

The Chair: I fail to appreciate how the value of a pattern can be more than it will cost to reproduce it, as Mr. Hanna has put it. I think the insurance company, in place of paying the valuation on the earning power of the pattern, would simply say, we will replace the pattern—which they would have a right to do, generally—if they could. Some years ago I was called in to give some expert testimony on the value of patterns, before an assessor. The county assessor had assessed a lot of stove patterns at a very high valuation because he had understood that the owners of the stove foundry had put a very high valuation on their patterns, on that form of stove. The lawyers finally got mixed up in the case, and they had a lot of testimony. The question was asked me at that time, what was the value of those patterns. I asked what kind of a value. The lawyer said he could only ask that question, what was the value. I said I could see two values, one an insurable value, what it would cost to replace the patterns, they being in active use, and the other the amount for which they would sell if they were put up at forced sale. In that case it was finally concluded, and perhaps without any evidence strictly to the point, that the value which should be taxable, was the value they would sell for on the market if put up and sold, although they were worth perhaps considerably more to the firm using them, as a tool—as Mr. Dingey's paper classifies patterns—to carry on their business. This paper, as Mr. Sorge has said, is readily divided into several different heads. I take it that a system for the care of patterns is a good system if it is carried out. And it is generally true that the man who can't make his own system can't carry out any system. But the question in the latter part of the paper, of the valuation which should be put on patterns, and how they should be placed, particularly in variable work, is one that I think we could have a great deal of very intelligent discussion on, and find out something that perhaps we don't know now.

Mr. Sorge: In talking about valuation of patterns for insurance value, you want to take into consideration the fact which you brought up, and that is the value of the pattern depends upon its use.

The Chair: Excuse me, don't you mean that its earning power depends on its use? How can its value be more than it costs to reproduce it?

Mr. Sorge: I don't say that it is; it don't figure out so, either. A statement has been made, and the inference has been made by the President and Mr. Hanna that according to this method of figuring the value of the pattern would figure more than the cost to replace them. When this is figured out, and I have taken occasion to do it in one or two cases, the value comes considerably below the actual cost price. And I do not think that you can put upon patterns the value which is the cost of replacing them. To start with, usually you have considerable wear out of a pattern. As Mr. Hanna correctly states, in that case he has to take in the element of time which that pattern will last, or in other words, the amount of work which the pattern will do, or its earning capacity. Whether you put it in the shape of the time it will last, or whether in the shape of the amount of dollars which it will earn, the two will work together. On the other hand, you have usually in your pattern loft, from one-half to nine-tenths of the patterns that are dead lumber, during five years out of six, or I might say 364 days out of 365 while on the 365th day some set of patterns becomes immensely valuable. It becomes worth as much as it cost to produce it. I do not think that the question of whether a pattern has been charged in the cost of a job or not comes in at all in the valuation. It doesn't make any difference to the insurance company or to anybody else whether I have received one dollar or ten thousand for it, but I have got the thing in my hand and I want to use it, I want to insure it, that is the thing; and it has a certain value to me, or a certain value to others. Is there a recognizable value that can be fixed upon so as to satisfy all parties, and it is possible for anybody to give any other basis to go upon than the earning capacity? Anything else, any other estimate that you may make depends upon the individual, and the estimate will vary with the individual, and no two estimates will be alike. Isn't it well that we should come to some basis, to a logical deduction, a valuation from some certain premise?

Mr. Dingey: With regard to the earning capacity that should be put on a pattern, I don't see how it can be estimated in that way, because, as the President has just remarked, a pattern may or may not be used again. How can you get at the earning capacity of that pattern? You don't know how it will be used, don't know whether it will be used again, and I don't see how you can put a valuation on the earning capacity.

Mr. Sorge: I would like to defend myself against the statement of its being an estimated earning capacity; it is actual earning capacity, determined from the actual costs and actual earnings from the castings produced by it, not an estimated earning capacity.

Mr. Hanna: How are you going to tell what the pattern is going to earn, if you have no chance to use the pattern?

Mr. Sorge: By taking a long average of a year or two for what work has been done with those patterns; that is the basis I would go on. Take one or two years of work actually accomplished by the patterns in your place; assume that to be a fair basis of what you are going to do.

Mr. Hanna: About when, then, would the pattern be ripe and ready to throw away? If we only used it once, the first time, how long would we hold it?

Mr. Sorge: That depends on your judgment; if you are never going to use it again, throw it away.

Mr. Hanna: The element of judgment comes in then.

Mr. Sorge: The second year, for instance, would show that certain patterns were not being used at all. And your judgment would indicate whether they should be destroyed.

Mr. Hanna: It seems to me that a pattern has value as put upon it by the firm, from the record kept, as long as it is not obsolete; when it is obsolete then it is fit for kindling wood, but it still has a value to the foundryman, whether it is this year or ten years from now. If he has manufactured but one

machine he is very loth to destroy that pattern that is fairly well made, because he surely will use it some time, if he saves it, and that machine is in existence. Therefore, these patterns always have a value. So a man, in knowing his business, governs himself according to his inventory of patterns and the valuation he puts on them, and I don't think the earning capacity of the pattern should be taken into consideration.

The Chair: The Chair has appointed, under the new by-laws, as editing committee, Mr. A. Sorge, Jr., Mr. Wm. Ferguson and Mr. J. K. McKenzie. Before the next regular meeting, the joys and sorrows of Christmas and New Year's will have gone by, and I trust and hope that we will have a full attendance hereafter, more if possible than this evening—I mean as to numbers—and that each individual who attends these meetings will endeavor to enlarge the discussion. I feel sometimes that I insist perhaps a little too much on this, but I feel that is the way to make this association grow. We don't want anything stilted at these meetings, we want to come here and talk to each other informally, and just try and infuse a little of that feeling into ourselves, and take advantage of it. The finances of the association are in much better shape than they have been heretofore. The Secretary advocated that a little of the association's money had better be spent this evening in the way of refreshments at the other end of the room.

The meeting then adjourned. After adjournment, a lunch was served, and the members remained for some time in friendly discussion.

Mannocitin for Rust Prevention.

Manufacturers in all branches of iron and metal work will be interested in a compound that is offered for the absolute and permanent prevention of rust and corrosion on machinery, tools, and metal products of all kinds. Mannocitin, manufactured by Ed. Mueller & Mnn, Charlottenburg, Germany, is the name of the compound. Otto Goetze, 17 Whitehall st., New York, is sole agent in the United States. In Europe, Mannocitin has been in use for four years; to-day the German state railways, army and navy and leading manufacturers use it on a large scale, which goes to show, its promoters argue, that it has worth and deserves the attention of American manufacturers.

Mannocitin is composed of greases and oils. The oils evaporate after application, leaving a thin film which adheres to the metal and offers castings protection against weather, water and fumes of muriatic acid and ammonia. It leaves no spots but preserves the original polish of the metal. As to covering capacity, one gallon is sufficient to protect a surface of over 1,100 square feet. The compound is easily applied and quickly removed. The latter is a point that will be appreciated in its saving of time and labor.

The New York agent, Otto Goetze, states that since he started introducing Mannocitin in the United States several months ago, he has received numerous orders from large manufacturing concerns. The testimonials from users of the compound in Germany include a large variety of establishments. Among American references are the Galveston & Western Railroad Co., Williams, White & Co., iron works, Moline, Ill., and W. O. Hickok Mfg. Co., manufacturers of machinery for book-binding, Harrisburg, Pa.

FOR several years the Illinois Steel Co., of Chicago, has been a large user of Pocahontas coke. A dispatch from Roanoke states that that company has now made a contract with the Pocahontas Coal Co. for 500,000 tons of coke to be delivered during 1896. It is stated that the steel company will furnish its own cars and the business will aggregate about eighty carloads per day.

ANOTHER of the *American Artisan* manuals for sheet-metal workers is fresh from the press, with an 1896 imprint. Pattern cutting has a chapter of its own, and there is a large body of work-shop recipes, tables of measurement, handy formulas, etc., that will be valuable to the heating, roofing, and hardware trades, and to all who have to do with building operations. John J. Davies is the compiler, and the American Artisan Press the publisher.

IT is reported that the old Martel Furnace (charcoal iron) at St. Ignace, Mich., idle for two years, will soon go in blast.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

The Connell & Dengler Machine Co., of Rochester, N. Y., is in the market for a second-hand lathe, with short bed suitable for turning, facing and boring wheels 60 inches in diameter and six-inch face.

The Union Foundry Co. has been incorporated at Rochester, N. Y., with a capital stock of $10,000, to conduct a general foundry and machine business, by E. R. Trimble, C. H. Bird, M. B. Trimble, and M. A. Bird.

The Erwin Mfg. Co., of Greenbush, N. Y., has just been organized to build bicycles. The company will occupy the factory where the Rollason gas engines were formerly made. It has lately been enlarged and put in good order.

New Construction:—

At Huntington, W. Va., Edwin Turley is erecting a machine shop, two stories high, 50x42 feet.

The Niles Tool Works, of Hamilton, O., are building a new foundry, 400x200 feet, and one story. It will be completed in three months.

The Alexander Smith & Sons Carpet Co., of Yonkers, N. Y., has placed the contract for its new dye house building with the Berlin Iron Bridge Co., of East Berlin Conn. The building is 60 feet wide and 172 feet long, the steel roof trusses being arranged to carry cars on the lower chord for moving material about the building.

Fires and Accidents:—

The engine room of the butt mill of the American Tube & Iron Works, at Harrisburg, Pa., was burned recently and the mill itself was considerably damaged. The loss is $10,000.

Additions, Enlargements, Removals, Etc.:—

At Wilkesbarre, Pa., work has begun on additional buildings for the Hazard Wire Rope Works, two stories, 63 by 89, and 110 by 25 feet.

McNab & Harlin, of Paterson, N. J., are to build a new foundry near their present plant. The property has already been purchased.

In the converting department of Jones & Laughlins' plant on the South Side, Pittsburg, 10-ton, instead of eight-ton vessels, will be put in. Contracts have been let for a new blooming mill, in which it is expected the engines will be among the largest in the country, adapted to the work in view. The firm will also make its own ingot molds, and a building for this purpose will be erected. An additional open-hearth plant is now being constructed. These improvements will necessitate a larger force of men and will place the firm as among the foremost of the country.

General Industrial Notes:—

Preparations are being made to blow in Talladega furnace at Talladega, Ala.

At Gadsden, Ala., the Alabama Furnace Co. will put its plant in blast next month.

H. F. DeBardeleben, of Birmingham, and associates will reopen the brown ore mines near Woodstock, Ala.

The Indiana Iron Works, at Muncie, Ind., have been closed for two weeks and will remain idle until after Jan. 1.

The large stack of the Andover Iron Co., at Phillipsburg, N. J., which has been idle for two years, has been put in operation.

The Anniston Rolling Mills, at Anniston, Ala., will soon be started up, but few alterations and repairs being needed to get the plant into shape.

The American Wire Nail Co., of Anderson, Ind., will start its plant the first Monday in January, and 485 employes now idle will resume work.

The Northwestern Car Wheel & Foundry Works, at St. Paul, has been purchased by the Griffin Car Wheel Co., of Chicago. The works are in East St. Paul.

The H. M. Myers Co., Beaver Falls, is making improve-

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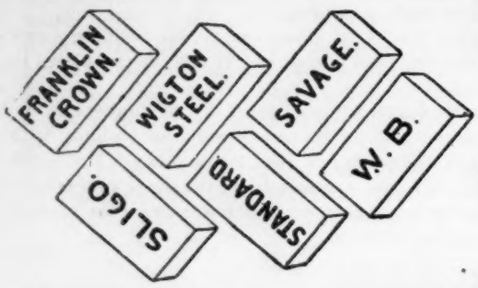

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Both ARE SMOKELESS.

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MANUFACTURERS OF

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Warehouse and Docks: 193-195 Merwin Street, CLEVELAND, OHIO.

ments in its rolling mill, which will give a capacity for turning out 300 dozen of one-piece solid steel shovels per day.

The proposition submitted to the citizens of Findlay, O., by W. P. Bonnell, of Youngstown, was to put $6,000 into the Brigg's rolling mill, on condition that citizens give $10,000 to put in a new fuel gas plant.

On Saturday, the 14th inst., all departments of the Homestead Steel Works, Homestead, Pa., with the exception of the 33-inch mill, closed down and will remain idle until after the first of the year. The annual inventory and repairs will be made.

The Eureka Steel Casting Co., of Chester, Pa., is to start up again. The concern closed down about 10 months ago after making an assignment. A settlement with the creditors has been affected, and the company resumes under the old management.

An addition is being made to the cast beds at Charlotte Furnace, Scottdale, Pa., to accommodate the increased amount of iron the furnace will produce after the repairs are completed. When the addition is finished the capacity will be doubled.

John S. Mooring, J. K. Dimmick, H. B. Cooper and J. J. Willett have leased the Anniston, Ala., Rolling Mills, and will put them in operation after repairs and minor improvements. The new company will incorporate as the Anniston Iron & Steel Co., with a capital of $50,000.

Car orders: Louisville, New Albany & Chicago, 100 stock cars; Portland & Rochester, 15 coal cars; Toledo, St. Louis & Kansas City receiver, 500 cars, authorized but not yet placed; Pennsylvania Railroad, 100 gondolas; Paragon Refining Co., eight tank cars; Manhattan Oil Co., 57 tank cars.

The Imperial Ball-Bearing Axle Co., of Chicago, has completed arrangements with the Gananoque Spring & Axle Co., of Gananoque, Ont., Can., for the exclusive manufacture of Imperial ball-bearing axles in Canada, having sold to the Ontario company the shop right for a term of years.

D. E. Garrison & Co., St. Louis, who have been the agents of the Illinois Steel Co. since its incorporation, have resigned the agency, the change to take effect Jan. 1. The only reason is that Garrison & Co.'s other interests have increased so rapidly that a withdrawal as agents for the Illinois Steel Co. was imperative.

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1—42″ Rotary Planer.
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1—32″x25 ft. N. H. Engine Lathe.
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Light Castings from One to One-Hundred Pounds a Specialty.

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E. C. Potter, Pres. H. L. Hollis, Vice-Pres.
MINING AND METALLURGICAL
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Sole owners in America of the
WALRAND-LEGENISEL STEEL PROCESS.

We are now prepared to place licenses for the use of the WALRAND LEGENISEL process, and to undertake the design and construction of plants with supervision of preliminary operation. The process can be seen in operation at the works of POTTER & HOLLIS FOUNDRY CO., at E. Chicago, Ind. This process is unequaled for the manufacture of solid and flawless steel castings or for any purpose requiring sound masses of steel.

OFFICE, 525 ROOKERY, CHICAGO.

Furnace No. 7, of the Illinois Steel Co., made an excellent run last month. An average of 314 tons per day was made on a coke consumption of 1,620 pounds. The burden was 3,716 pounds of lake ore, 90 pounds of scrap and 561 pounds of flux. The furnace has made at the rate of over 350 tons per day for a month, but not with so low a fuel consumption.

The Etna Furnace Co., is the new organization which is to take the Alice and Blanch furnaces at Ironton, O. It is said that one of the furnaces is to be remodeled and new hot blast stoves are to be put in. The furnace will have Pittsburg rates on coke and a slight increase over those rates on lake ores. Probably local ores will also be used in the mixture.

The Cleveland-Cliffs Iron Co.'s new machine shop at Gladstone, Mich., in addition to repair work for the furnace and chemical and dock plants, will undertake boiler repairs, heavy forgings, cast work, both in iron and brass, pipe fitting and bolt cutting, sheet iron work, and the finishing of machinery of large dimensions, and saw mill and steamboat work.

The Finished Steel Co., of Haselton, O., has appointed as its western sales agents the Andrews Bros. Co., John McLaughlan, manager, 808 New York Life Bldg., Chicago. The company's new plant, with an outfit of new machinery, and much of it special, will begin full operations about the first of the year. The product will be polished steel shafting, piston and pump rods, valve stems, fine machine rods, and special shapes.

A large electric plant is being put in at the works of the Troy Iron & Steel Co., Troy, N. Y. The engines are furnished by the Ball Engine Co., Erie, Pa,, and the dynamos by the Westinghouse Electric & Mfg. Co. Three 115 h. p. Ball tandem compound engines, direct connected to Westinghouse dynamos, and one 165 h. p. Ball tandem compound engine belted to Westinghouse dynamo, comprise the equipment.

Articles of incorporation were filed at Albany, N. Y., Dec. 18, forming the Cramp-Hoadley Co., with a capital stock of $1,000,000. The directors are Charles H. Cramp, Henry W. Cramp and Edwin S. Cramp, of William Cramp & Sons' Co., Philadelphia; George S. Graham, district attorney of Philadelphia; William W. Cook, general counsel for John W. Mackay and the Postal Telegraph Co., of New York, and J. H Hoadley, of Hoadley Bros, Chicago. This company will absorb all the rights of the Wheelock Engine Co., and the improved Green engine, together with the Green-Wheelock &

Hill valve gear, of Worcester, Mass., the Hoadley engine and the Hoadley rope transmission. It has also taken in the various interests of the New England Engineering Co. and Hoadley Co., of Illinois, as well as the various interests of Hoadley Bros. in California and the east. The company will also handle the output for land use and stationary purposes of the Cramp Co., and I. P. Morris & Co., of Philadelphia. Offices are established in New York City, Philadelphia, San Francisco and Chicago. The works at Worcester, Mass., and at Chicago will continue and be enlarged in addition to the erection of special works at Philadelphia.

Belgian Invasion of British Iron and Steel Trade.

The competition in Europe is greater than ever in the iron and steel markets of the world, and at first sight it would seem that Great Britain is losing ground in a very marked degree. At the same time it must be recognized that the output of England and Scotland has increased and there seems to be no overstocking or lack of market for the production. The figures from India, however, are startling, showing that the hold upon that market which has hitherto been looked upon as a sort of "private preserve" for the British iron and steel trade has been rudely invaded and broken up by Belgium and Germany. The figures speak for themselves. In 1890-91 the imports of iron and steel to India, amounted to 4,559,368 tons, were supplied by Great Britain in the proportion of 82 per cent, a very acceptable and healthy market for export trade. In 1891-92 this proportion diminished to 72.3 per cent; in 1892-93 to 63.39 per cent; in 1893-94 to 58.5 per cent, and in 1894 95 to 56.6 per cent. This has not come about by any accident or sudden change in the volume of trade, as the import into India in this last fiscal year was 4,110,091 tons, only about 400,000 tons less than in the first fiscal year quoted. Belgium is the most successful competitor, 39.5 per cent of the imports being credited to her, while her sales of steel exceeded those of Great Britain by 78,338 tons.—[Engineering and Mining Journal.

A SHOP manager who will go through his works at any part of the running time and note the proportion of his tools that are at the precise time of observation actually cutting work, may be surprised to find the percentage very small. This surprise will set him thinking of means to prevent this waste of time. He will find that perhaps a few lathe dogs are needed extra, so that one piece may be got ready while the other is cut. In most cases this investigation will do good—at least, some good.—[American Machinist.

Clergy Rate Will Remain the Same.

The question of a change in railroad fare charged clergymen has been settled by the managing officers of railways in territory covered by the Central Traffic Association agreeing to continue to allow a rate of one and one-half cents per mile. For the coming year regularly accredited clergymen, who may be entitled to the same under the rules, can therefore procure reduced rate tickets over the Pennsylvania Lines west of Pittsburg, same as during 1895.

A CALENDAR having for its heading the well-known electrotyped group of this company's steam pumps, is being sent out by the Battle Creek Steam Pump Co., of Battle Creek, Mich.

Holiday Excursions via Pennsylvania Lines.

On December 24, 25 and 31, 1895, and January 1, 1896, excursion tickets will be sold from ticket stations on the Pennsylvania Lines west of Pittsburg to points on those lines, valid to return until Jan. 2, 1896. For details, please apply to nearest Pennsylvania Line ticket agent.

The Atlanta Exposition.

One of the greatest fairs ever known to America. Many features of the Chicago World's Fair and new ones. Open Sept. 18 to Dec. 31. Low rates via the Queen & Crescent Route. Write to W. C. Rinearson, G. P. A., Cincinnati, O., for printed matter.

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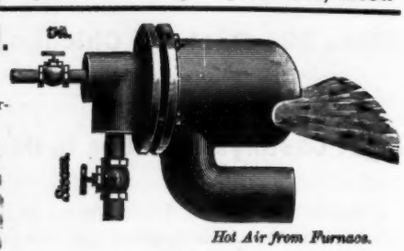

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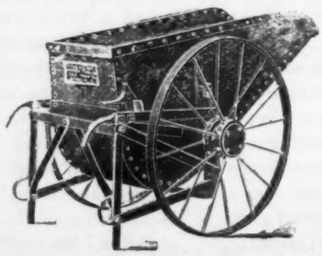

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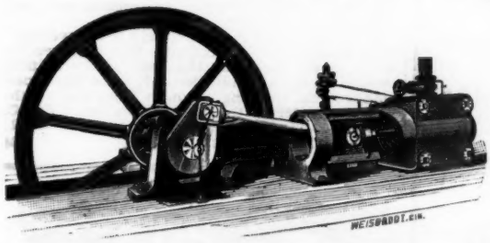

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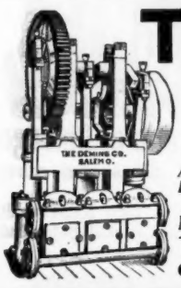

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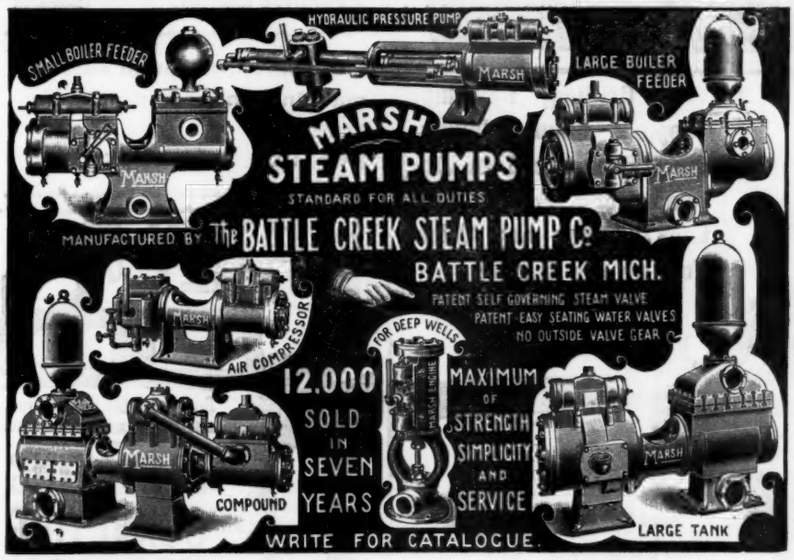

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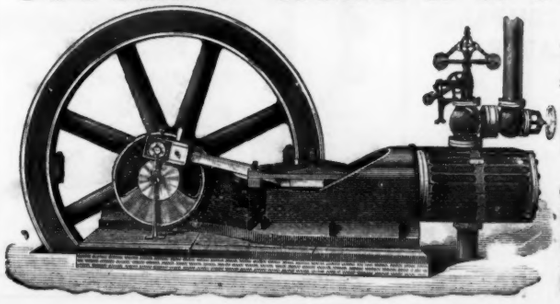

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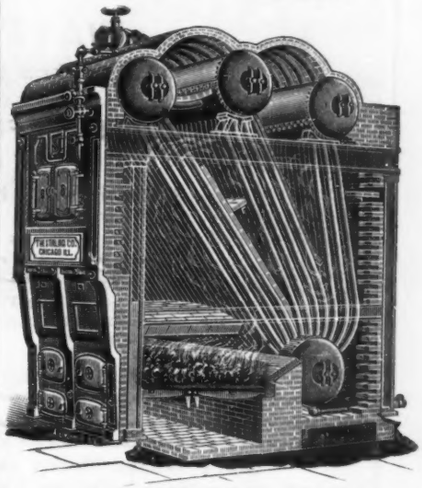

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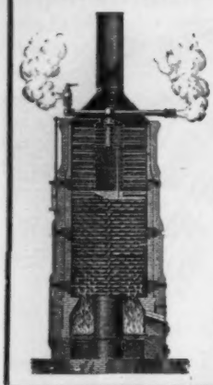

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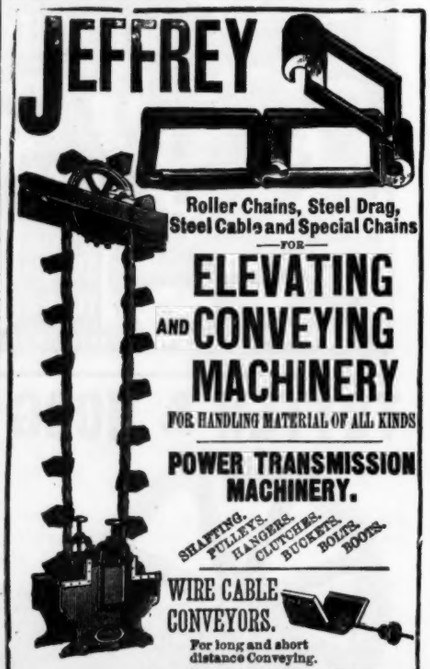

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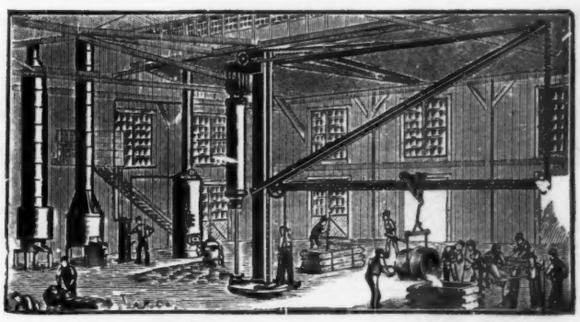
Lots of nice things, we hope, with just dead loads of Love behind them all.
It isn't the presents that makes the Christmas, but the hearts.

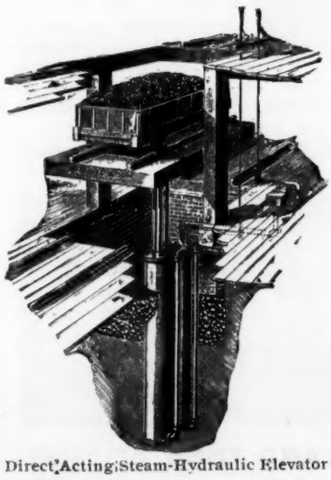
Of course you are not in the humor to-day to talk or even think Cranes, and neither are we—it's too soon after Christmas. But the end of the year is now within reaching distance and the new year will soon demand attention. What are you going to do next year? Are you still going along doing your work by main strength and awkwardness, wasting a big lot of money which you might have for next Christmas, or are you going to get into correspondence with RIDGWAY and find out whether or not he and that wonderful Crane of his he blows so much about, can really make the saving that he says it is doing for concerns all over the land?



5-ton Steam-Hydraulic Crane in a Foundry.

If we were you, that's one of the good resolutions we would make on New Years, along with usual batch of them. When a good responsible concern spreads out a list of users as long as your arm, which you at once recognize as the leading concerns in the land to back up what he says, that concern surely deserves more than ordinary consideration at the hands of wide-awake heads of establishments, don't it?

"PLEASE TAKE THE ELEVATOR."



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From Christmas privilege down to all the cares of every-day life, it brings you as gently as it took you up.

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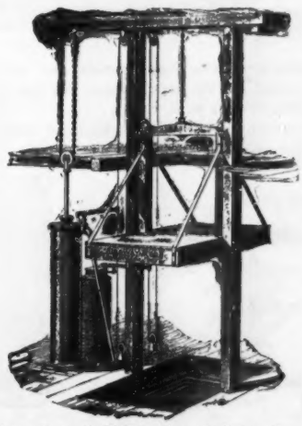
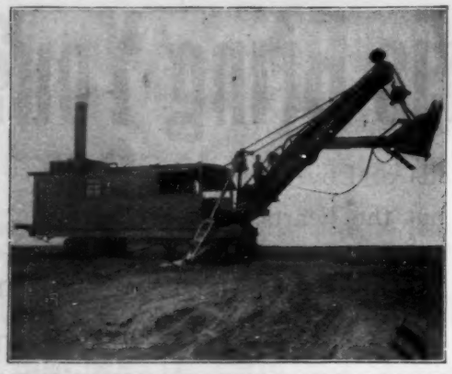


Steam Hydraulic Elevator, also made direct acting with cylinder under platform.



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STEAM SHOVELS	Five sizes for every purpose. Standard Railroad Shovels. Special Shovels to order.
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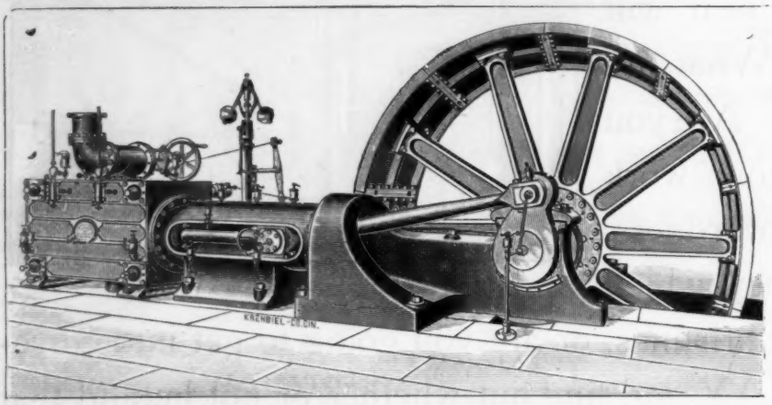

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See next issue.

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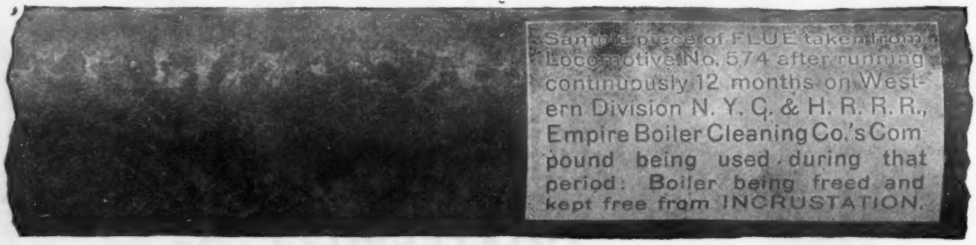
Sample piece of FLUE taken from Locomotive No. 574 after running continuously 12 months on Western Division N. Y. C. & H. R. R. R., Empire Boiler Cleaning Co.'s Compound being used during that period. Boiler being freed and kept free from INCRUSTATION.

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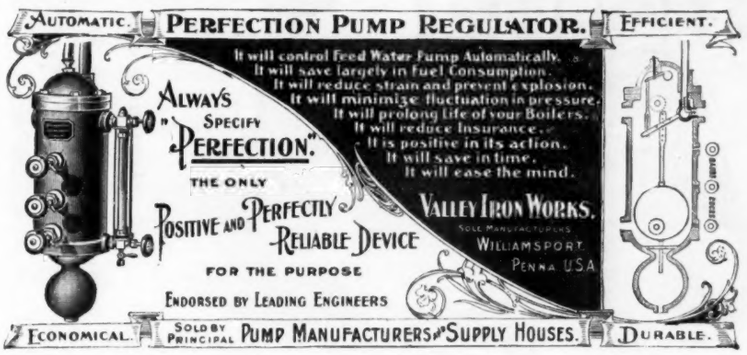
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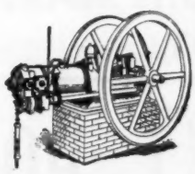

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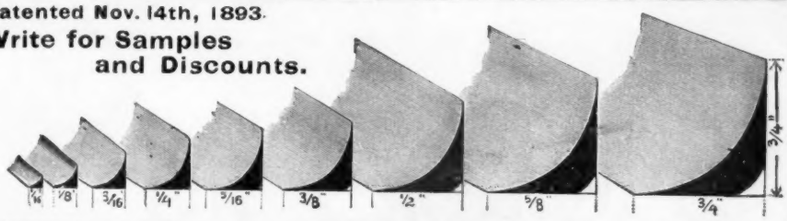

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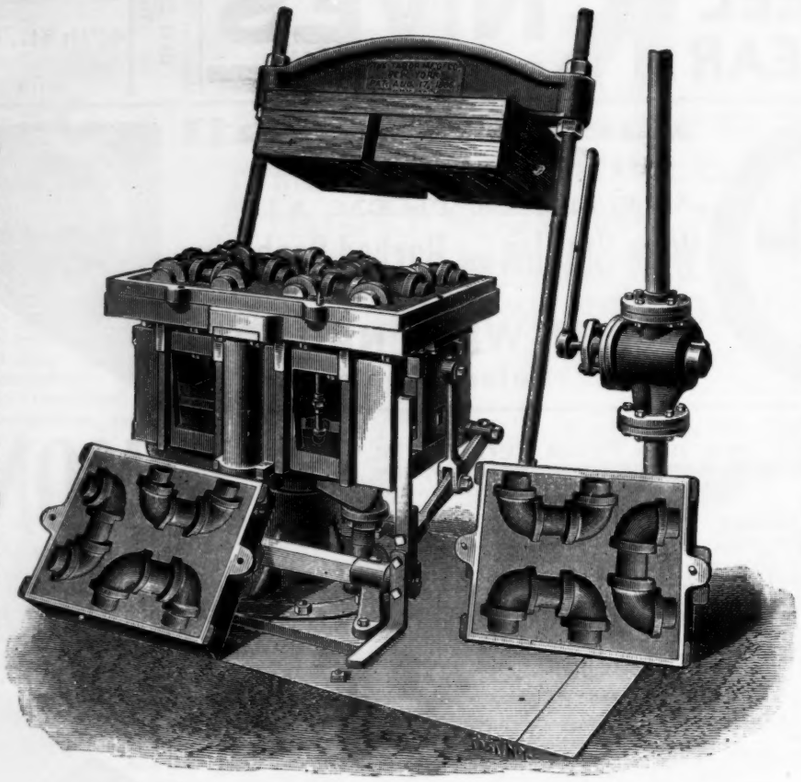

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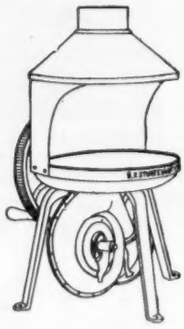

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THREE MOTOR ELECTRIC
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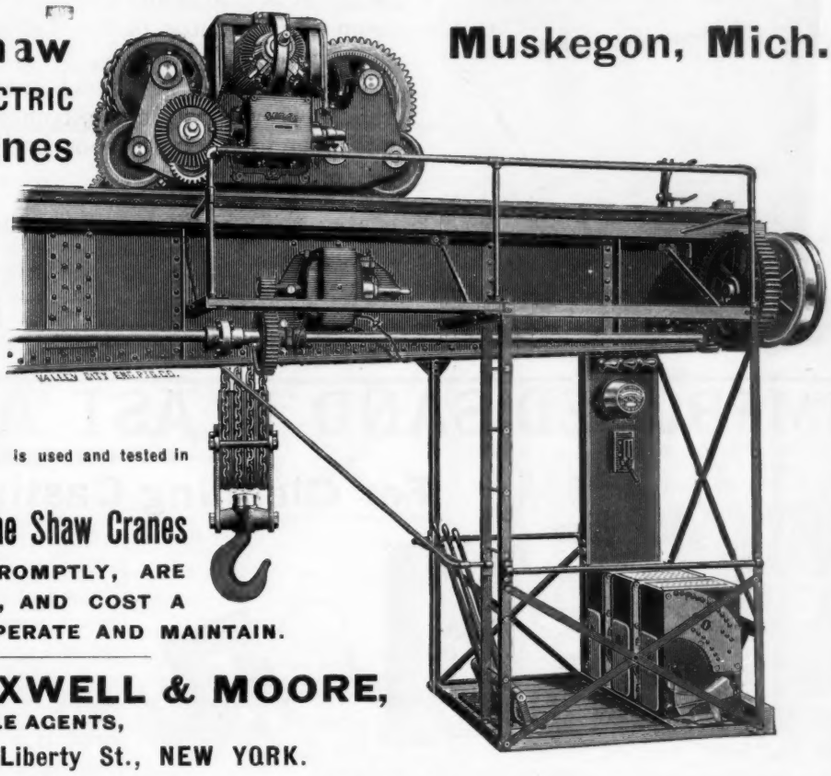

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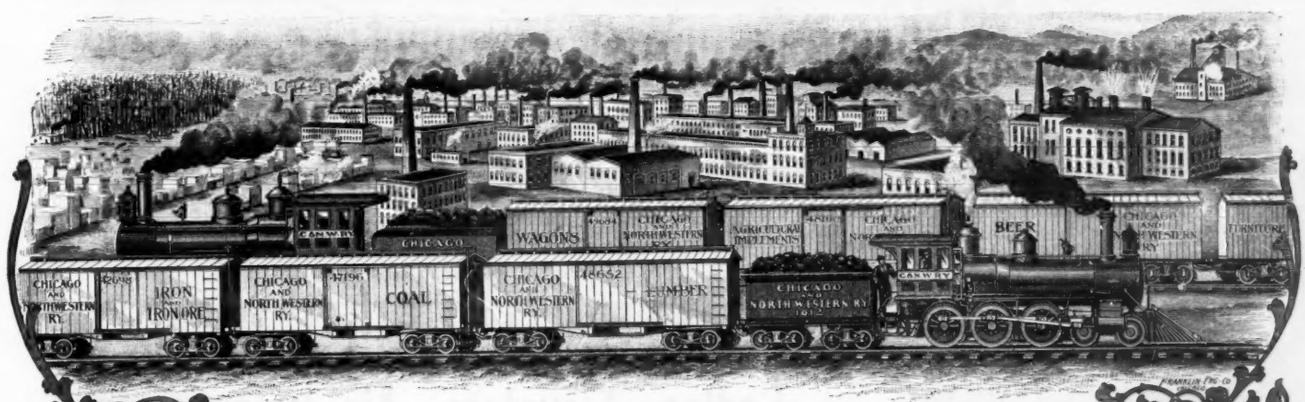

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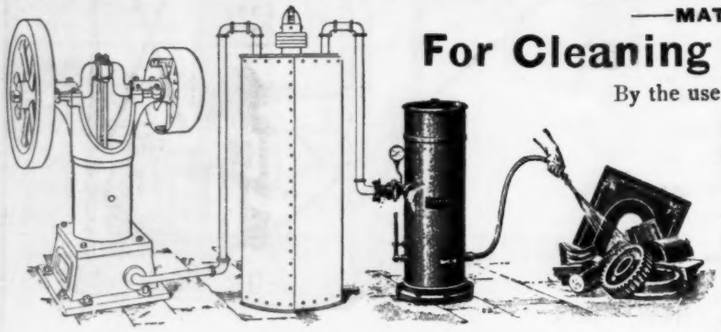

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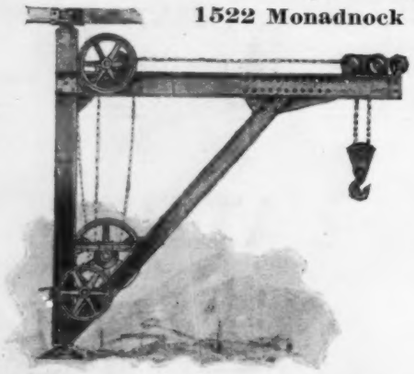

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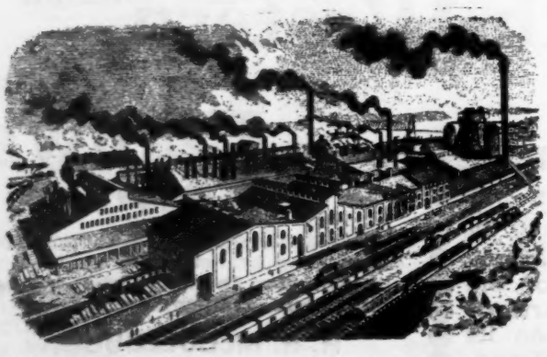

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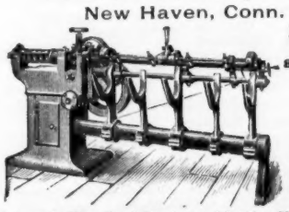

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" " " " 1250	"	125

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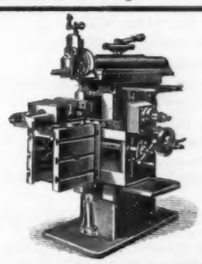

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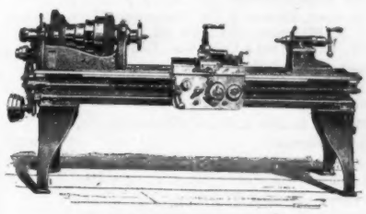

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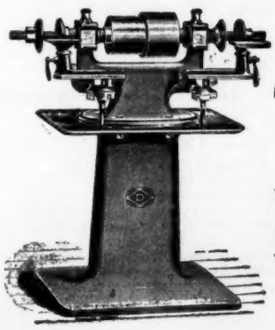

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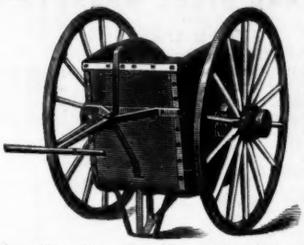

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Lansing Wheelbarrow Co., Lansing, Mich.

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Cleveland City Forge & Iron Co., Cleveland.

Rock Breakers—
American Hoist & Derrick Co., St. Paul, Minn.

Rolling Mill Machinery—
The Lloyd-Booth Co., Youngstown, O.
Totten & Hogg I. & S. F'dry Co., Pittsburg, Pa.

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Roofing (felt)—
Consolidated Roofing Works, Columbus, O.

Roofing Plates—
Morton Tin Plate Co., Cambridge, O.

Rust Preventatives—
Otto Goetze, New York City.

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The Lloyd-Booth Co., Youngstown, O.

Sand Blast Machines—
Ward & Nash, Chicago, Ill.

Saws—
Peter Gerlach & Co., Cleveland.

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Harrington & King Perforating Co., Chicago.

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Klein & Cohn, Cincinnati, O.

Screws—
Illinois Screw Co., Chicago, Ill.
C. H. Besly & Co., Chicago, Ill.
Upson Nut Co., Cleveland, O

Second-Hand Machinery—
Prentiss Tool & Supply Co., Chicago, Ill.
Hill, Clarke & Co., Chicago, Ill.
American Tool Works, Cleveland, O.

Semi-Steel—
McDowell Steel Co., Chicago, Ill.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City, Ind.
Toledo Machine & Tool Co., Toledo, O.
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Long & Allstatter Co., Hamilton, O.

Sheet Iron—
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Berger Bros., Philadelphia Pa.
Ætna-Standard Iron & Steel Co, Bridgeport, O.

Smoke Consumers—
American Smokeless Furnace Co., Cleveland, O.
Brightman Furnace Co., Cleveland, O.

Special Machinery—
Toledo Machine & Tool Co., Toledo, O.
Cady Mfg. Co., Cleveland, O.

Stacks—
Wm. B. Scaife & Sons, Pittsburg, Pa.

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Cady Mfg. Co., Cleveland, O.

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Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

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C. H. Besly & Co., Chicago Ill

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C. H. Besly & Co., Chicago, Ill.

Steam Shovels and Dredges—
Bucyrus Steam Shovel & Dredge Co., Bucyrus, O.
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Steam Specialties—
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Wm. Jessop & Sons, Ltd., New York, N. Y.

Steel Castings—
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Universal Telephone Co., Indianapolis, Ind.

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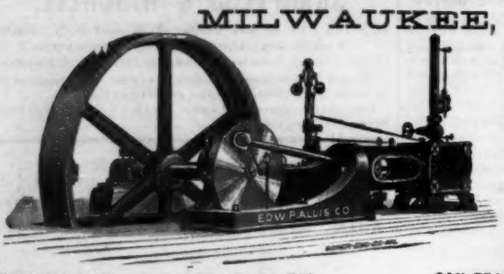

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The Industrial Centre of Chicago

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If you are seeking a new location it will pay you well to investigate the merits of our proposition.

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IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	$4.75@ 5.25
No. 1 Bessemer hematite	4.25@ 4.50
Hematites No. 1 non-Bessemer	2.50@ 3.00
No 1. Specular, non-Bessemer	3.00@ 3.50

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$11 75@ 12 00
No. 1 Strong Foundry	14 25@ 14 50
No. 2 Strong Foundry	13 50@ 13 75
No. 1 Gray Forge, red short	12 25@ 12 50
No. 2 Gray Forge, neutral	12 00
No. 1 American Scotch	14 75
No. 2 American Scotch	14 25
Lake Superior Charcoal	14 50@ 15 00
PITTSBURG:	
No. 1 Foundry	$14 00@ 14 25
No. 2 Foundry	13 25@ 13 50
Gray Forge	12 00@ 12 25
White and Mottled	11 75@ 12 00
Warm Blast Charcoal	16 00@ 17 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	11 75@ 12 00
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$14 50@$15 50
Local Coke Foundry No. 1	14 50@ 15 00
Local Coke Foundry No. 2	14 00@ 14 50
Local Coke Foundry No. 3	13 50@ 14 00
Local Scotch Foundry No. 1	14 50@ 15 00
Local Scotch Foundry No. 2	14 00@ 14 50
Local Scotch Foundry No. 3	13 50@ 14 00
Southern Coke No. 1	10 70@ 11 00
Southern Coke No. 2	12 85 .....
Southern Coke No. 3	12 60 .....
Southern No. 1 Soft	13 10 .....
Southern No. 2 Soft	12 85 .....
Southern Silveries No. 1	14 00 .....
Southern Silveries No. 2	13 50 .....
Jackson Co. Silveries	14 50@ 16 00
Ohio Silveries No. 1	15 00@ 15 50
Ohio Silveries No. 2	14 50@ 15 00
Ohio Strong Softeners	15 00@ 15 50
Alabama Car Wheel	17 00@ 17 50
Malleable Bessemer	.....
Coke Bessemer	.....
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$12 50@$13 00
Southern Coke No. 2 and No. 1 Soft	12 25@ 13 00
Hanging Rock Coke, No 1	12 50@ 13 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	13 50@ 14 00
Jackson County Silvery No 1	14 00@ 15 00
Southern Coke, Gray Forge	12 00@ 12 50
" " Mottled	11 75@ 12 25
Standard Alabama Car Wheel	15 75@ 16 25
Tennessee " "	14 50@ 15 00
Lake Superior " "	16 50@ 17 50
BUFFALO (reported by Rogers, Brown & Co.)	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	$14 50
No. 2 Foundry Strong Coke Iron Lake Superior Ore	14 00
Ohio Strong Softener No. 1	16 25@ 16 75
Jackson Co. Silvery No. 1	16 25@ 17 00
Lake Superior Charcoal	16 75
Southern Soft No. 1	15 15@ 15 60
Hanging Rock Charcoal	18 55
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Southern Coke No 1	$13 50@$13 75
Southern Coke No. 2	13 25@ 13 50
Southern Coke No. 3	13 00@ 13 25
Southern Gray Forge	13 00@ 13 25
Southern Charcoal No. 1	14 50@ 15 00
Missouri Charcoal No. 1	14 00@ 15 00
Ohio Softeners	16 00@ 17 00
Lake Superior Car Wheel	17 00@ 17 50
Southern Car Wheel	16 50@ 17 50

OLD RAILS AND SCRAP METAL.

	Gross Tons
Old iron rails	$16 50
Old steel rails	13 00
Old car wheels	13 00
	Net Tons
No. 1 R. R. wrought scrap	$12 00
Mill scrap	10 00
No. 1 Machine cast scrap	10 00
Iron axles	17 00
Axle turnings	8 50
Wrought turnings (free from cast)	8 00
Cast borings	7 50
Uncut wrought iron boilers	5 00
Steel boiler plates	11 50
Grate bars	6 50
Pipes and flues (clean)	9 50
Tank iron	9 50
Hoop and band iron	7 00
Sheet iron	7 00
Wrought drillings	8 00
Malleable iron	9 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.59c@1.64c
Angles	1.49c@1.54c
Tees	1.65c@1.70c
Universal Plates	1.50c
Sheared Plates	1.60c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 60
4½ to 6 by ⅜ to 1 inch	1 65
1¾ to 6 by 1⅛ to 2 inch	1 85
1¼ & 1⅜ by ⅜ to ¾ inch	1 60
1 & 1¼ by ⅜ to ¾ inch	1 70
⅝, ¾, ⅞, by ⅜ to ⅞ inch	1 80

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

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18, 20 and 22 Johnson St., CLEVELAND, O.

SEND FOR OUR NEW CATALOGUE OF Power Presses, Drop Hammers, Punches and Shears, Wire Working and Special Machinery.

PERFORATED METALS

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PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

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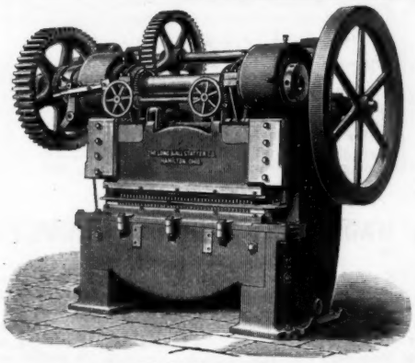

Multiple Punch.

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Long & Allstatter Co.

HAMILTON, O., U. S. A.

Manufacturers of Belt, Steam and Electrically driven

Power Punches and Shears

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc. Send for catalogue.

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MANUFACTURERS OF HIGH GRADE FIRE BRICKS

PITTSBURG, PA.

Works and Mines, Westmoreland, Pa.

DIXON'S GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. IT IS ABSOLUTELY WITHOUT AN EQUAL.

Tin roofs well painted have not required repainting for 10 to 15 years.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

IRON CLAD PAINT CO.

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ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 60
2 to 2⅝ inch	1 80
2¾ to 3¼ inch	1 75
3⅜ to 4 inch	2 10
4¼ to 4½ inch	2 70
4¾ to 5 inch	2 90

Oval.

⅜ to 1¼ inch	1 80
⅝ to ¾ inch	1 80
½	2 00
⅝	2 20

Half Oval and Half Round.

1¼ to 3 inch	2 15
⅜ to 1¼ inch	1 95
⅝ to ¾ inch	2 20
½	2 35
⅝	3 45

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 70
1 to 1¾ by ¼ and 5-16 inch	1 75
¼ to ⅞ by ¼ and 5-16 inch	1 85
½ to ⅝ by ¼ and 5-16 inch	2 10

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	2 15
1 7-16 to 2, No. 17, 18 and 19	2 20
1 7-16 to 2, No. 20	2 30
1 7-16 to 2, No. 21	2 40
1 7-16 to 2, No. 22	2 50
1⅛ to 1⅜, No. 13, 14 and 15	2 20
1⅛ to 1⅜, No. 16, 17 and 18	2 25
1⅛ to 1⅜, No 19 and 20	2 30
1⅛ to 1⅜, No. 21	2 40
1⅛ to 1⅜, No. 22	2 50
15-16 and 1 inch, No. 13, 14 and 15	2 15
15-16 and 1 inch, No. 16, 17 and 18	2 30
15-16 and 1 inch, No. 19 and 20	2 40
15-16 and 1 inch, No. 21	2 50
15-16 and 1 inch, No. 22	2 60
⅞, No. 13, 14 and 15	2 40
⅞, No. 16, 17 and 18	2 0
⅞, No. 19 and 20	2 60
⅞, No. 21	2 70
⅞, No. 22	2 80
13-16, No. 13, 14 and 15	2 50
13-16, No. 16, 17 and 18	2 60
13-16, No. 19 and 20	2 70
13-16, No. 21	2 80
13-16, No. 22	2 90
¾, No. 13, 14 and 15	2 60
¾, No. 16, 17 and 18	2 75
¾, No. 19 and 20	2 85
¾, No. 21	2 95
¾, No. 22	3 05
11-16, No. 13, 14 and 15	2 85
11-16, No. 16, 17 and 18	2 90
11-16, No. 19 and 20	3 00
1-16, No. 21	3 10
11-16, No. 22	3 20
11-16, No. 23	3 30
⅝, No. 13, and 15	2 90
⅝, No. 16, 17 and 18	3 00
⅝, No. 19 and 20	3 10
⅝, No. 21	3 20
⅝, No. 22	3 30
⅝, No. 23	3 40
9-16, No. 13, 14 and 15	3 10
9-16, No. 16, 17 and 18	3 20
9-16, No. and 20	3 30
9-16, No. 21	3 40
9-16, No. 22	3 50
9-16, No. 23	3 60
7-16 and ½ inch, No. 13, 14 and 15	3 30
7-16 and ½ inch, No. 16, 17 and 18	3 40
7-16 and ½ inch, No. 19 and 20	3 50
7-16 and ½ inch, No. 21	3 60
7-16 and ½ inch, No. 22	3 70
7-16 and ½ inch, No. 23	3 80
⅜, No. 13, 14 and 15	3 80
⅜, No. 16, 17 and 18	3 90
⅜, No. 19 and 20	4 00
⅜, No. 21	5 30
⅜, No. 22	4 40
⅜, No. 23	4 55

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 90
1¼ to 6 by Nos. 11 and 12	1 95
1 to 1¾ by ⅛ to 3-16 inch	1 95
1 to 1¾ by Nos. 11 and 12	2 00
⅞ and 13-16 by ⅛ to 3-16 inch	2 10
⅞ and 13-16 by Nos. 11 and 12	2 15
¾ and 11-16 by ⅛ to 3-16 inch	2 20
¾ and 11-16 by Nos. 11 and 12	2 25
⅝ and 9-16 by ⅛ to 3-16 inch	2 35
⅝ and 9-16 by Nos. 11 and 12	2 40
½ by ⅛ to 3-16 inch	2 50
½ by Nos. 11 and 12	2 55

Wagon Box Iron.

⅜ inch, beveled edge, by Nos. 11 and 12	2 10
⅜ inch, " " " " 13 and 14	2 20
½ inch, " " " " 11 and 12	2 25
½ inch, " " " " 13 and 14	1 55

Sheet Iron.

No. 10	2 10
No. 12	2 20
No. 14	2 25
No. 15-17	2 35
No. 18	2 50
No. 20	2 65
No. 22-24	2 75
No. 25-26	2 85
No. 27	2 95

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 00
Shell	2 15
Flange	2 25
Marine Flange	2 60
Fire Box	3 70

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08

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MANUFACTURERS OF

TIN AND TERNE PLATE, Iron and Ste Plates and Sheets, Plain Black, Painted, Corrugated and other forms of **ROOFING, SIDING and CEILING. Patent Leveled Galvanized Sheets, BARS, Light Section Rails, ANGLES, Tees, Channels, and other Miscellaneous Bars and SHAPES.**

WITH SUCH DIVERSITY OF PRODUCT,

SPECIAL ADVANTAGES are offered buyers of mixed lots, effecting saving in freight charges and by reason of our LARGE STOCKS, securing **PROMPT SHIPMENT.**

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HOISTING MACHINERY

for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling, and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

Send for Illustrated Catalogue giving full description, etc.

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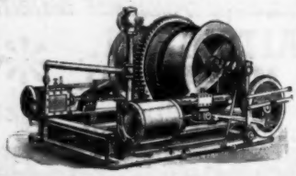

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Moisture	00.156	Sulphur	00.677
Fixed Carbon	93.625	Ash	05 004
Volatile Matter	00.494		

Foundry, Furnace and all sizes of crushed coke. Guaranteed lower in Sulphur than any other commercial coke

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They have no equal when used for the purpose designated. They are **good, honest, well made** Brick, **made** to hold **your** trade.

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Oak Hill Fire Brick & Coal Co., Manufacturers, OAK HILL, OHIO.

7-16 to ⅜ and 2⅜ to 3 in	.09
3⅜ to 4 in	.09½
½ to 11-16 and 4½	.10
⅝ to 6 in	.10¼
⅝ to 9-32 and 6⅝ to 7 in	.11
7 in	.13

Flats.

	cts. lbs
2 to 9-16 in. wide by 2 to ⅝ thick	.8

Bessemer and O. H. Steel.

Bessemer Machinery	base price, 1 50
Open-hearth Tire	" 1 80
Open-hearth Spring	" 2 20
Sleigh Shoe	" 1 90
Toe Calk	" 2 10
Cutter Shoes, tapered and bent	" 2 20

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

Wrought Pipe and Boiler Tubes.

Lap weld black, base	dis. 65
Butt " " "	dis. 55
Lap " galv. "	dis. 5 ½
Butt " " "	dis. 50
Boiler tubes 2¼" and smaller	dis 6 ½
Boiler tubes 2½" and larger	dis. 65
Casing screw and socket joint	dis. 52½
Casing inserted joint	dis. 47½

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Anvils.

American	₩ lb 9@10
Wright's	₩ lb 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

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Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 4(
Standard, oak tanned	dis 50&1(
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis
Horton's Universal	dis
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe. Milling Cutters	dis
" " Gear Cutters	dis

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Cast Steel	₩ 3½
Iron, steel points	₩ lb 3

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Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1⅛"	dis 50&10
Morse Taper and Straight Shank Larger than 1⅛"	dis 25
Drill Sockets	dis 25
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Cleveland " "	dis 55@55&5

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The American Iron and Steel Association.

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THROUGH TRAINS RUN AS FOLLOWS BY CENTRAL TIME
* Daily. † Daily, except Sunday.

	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†12:45 pm	†12:10 pm
Akron and Orrville	† 3:25 pm	† 9.50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

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Valley Jctn. & Way Stations	*6:30 P M	*7:10 A M
Akron, Canton & Valley	*10:10 A M	*3:15 P M
Akron, Canton & Chicago	*8:10 A M	*6:30 P M
Akron, Canton & Wooster, Defiance, Garrett, Marietta, Wheeling, Washington, D. C., and Baltimore	†2:55 P M	†11:00 A M

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New Year, 1896.

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Tickets will be sold between all points on the Big Four Route, good going December 24, 25 and 31, 1895, and January 1, 1896, good returning until January 2, 1896, inclusive.

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Files.

Arcade.....dis 60&10@60&10&10
Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
McClellan.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
Industry File Works Hand Cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....12c
" " " " over 5 lbs.....10c

Jack Screws.

Illinois Bolt Co. list.....dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¾	4	3¾	3¼
Hexagon	15¾	11½	8½	6	5¾	5¼	
Washers	9	8	7	5	4½	4¼	4¼

In lots less than 100 lbs, ¶ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887.....dis 85
Standard Penny Nails, ¶ keg card rate
Car lots.....$2 30
Less than car lots.....$2 50

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ¶ doz.....dis 10@10&10

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 50
Medart Pulleys.....dis 50
Split Wood Pulleys.....dis 55@60

Pulley Blocks.

Moore's Anti-Friction Differential Chain Pulley Block.....dis 20

Rivets.

Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....is 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2¼ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass.....dis 4c
Copper.....dis 4c
Bright and annealed, Nos. 0@18.....dis 70&10@75
" " Nos. 19@26.....dis 75@75& 5
" " Nos. 27@36.....dis 75&10& 5
Coppered Nos. 0 to 18, market list.....dis 70@70& 5
Galvanized Nos. 0 to 18 " " .....dis65& 5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ¶ lb dis 30

Wrenches.

Coe's genuine.....dis 50
Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanic's.....dis 55&10& 5
Bemis & Call's Combination.....dis 35
Donohue's Engineers.....dis 20&10
Lamson & Sessions Engineers.....dis 60
Billings & Spencer's Drop Forged.....dis 25
William's " " .....dis 25
Alligator " " .....dis 40

Emery.

	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, C. F. F. FF.
Kegs, ¶ lb	4½c	5 c	2¾c
½ kegs ¶ lb	4¾c	5¼c	2¾c
¼ kegs ¶ lb	5 c	5½c	3 c
10 lb cans, 10 in case	6 c	6½c	5 c
10 lb cans less than 10	10 c	10 c	7½c

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Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
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Hamden.....dis 60&10@70
Cyclone.....dis 60@60&10

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First:—A tract of land bounded on the North by lands of W. Pierce, B. Myers, M. L. Knight, and others, and on the East by lands of heirs of John Thornton, deceased; on the South by lands of J. L. Miller, Charles Heinz, and Charles Hall, parcel No. 3, a private road and lands of the Sharon railroad, and on the West by the Shenango river, containing about 42 acres. Improvements, one blast furnace now in full blast, one office building, and fourteen dwelling houses. Subject to the rights of way held by the E. & P. R. R. Co., the Sharon Railway, and the Valley Electric Railway Co.

Second:—A parcel of land adjoining the tract above described lying between the E. & P. R. R., and the Sharon and Sharpsville public road, size 50 feet by 80 feet. Improvements, one dwelling house.

Third:—A parcel of land bounded on the North by a part of the lands embraced in the first parcel, and lands of Charles Hall, on the East by lands of Charles Hall and a public road, on the South by lands of Tanner and Carnes, and on the West by lands embraced in the right-of-way of the E. & P. R. R., and a part of the land embraced in the first parcel, containing about seven and a half (7½) acres. Improvements, one dwelling house, occupied by the furnace manager, one tenant house, frame barn, etc. Said lands are shown on a map made by J. M. Goodwin, C. E. Three railroads, the Pennsylvania Company, the Erie, and the Lake Shore now have access to said furnace. Terms, ten per cent at time of sale, the remainder in three installments, one-third when sale is confirmed, one-third in six months, and one-third in one year. Deferred payment secured by bond and mortgage with interest.

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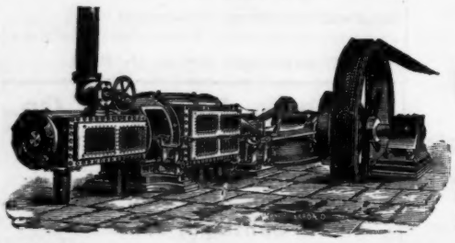

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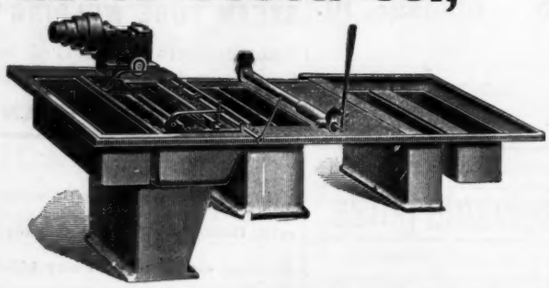

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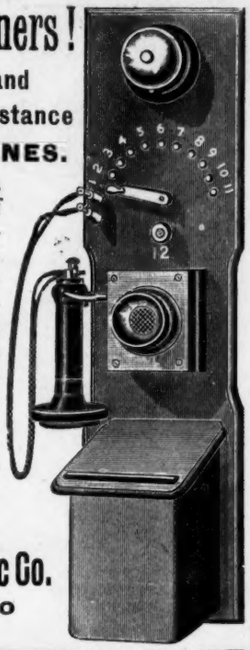

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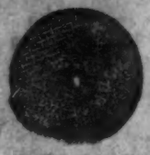

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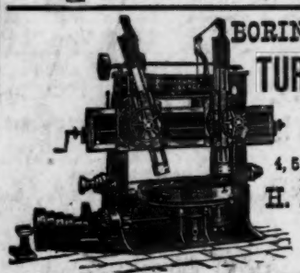

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